September 1977

Smithsonian

Wasted water energy
cascades over falls
in New England (p. 82)

Henredon interprets the golden age of furniture design
in a finely crafted bedroom, dining and living collection for today's homes of enduring taste
and character. This regal canopy bed recalls the provinces of France—is at home in city or country settings.
The armoire has removable shelf, partitions and back panel to permit installation of TV or sound equipment—
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Henredon, Dept. S-97, Morganton, N.C. 28655.

Henredon

Crinoids are beautiful even in black-and-white.

Actually, you wouldn't be able to see here the difference between Kodachrome film and the new Kodak Ektachrome films.

D. B. Macurda, Jr. of the University of Michigan Museum of Paleontology shot more than 350 36-exposure rolls of Kodachrome 25 film underwater in the Pacific and Indian Oceans in a program to learn more from the fossil record left by the ancestors of these beautiful animals.

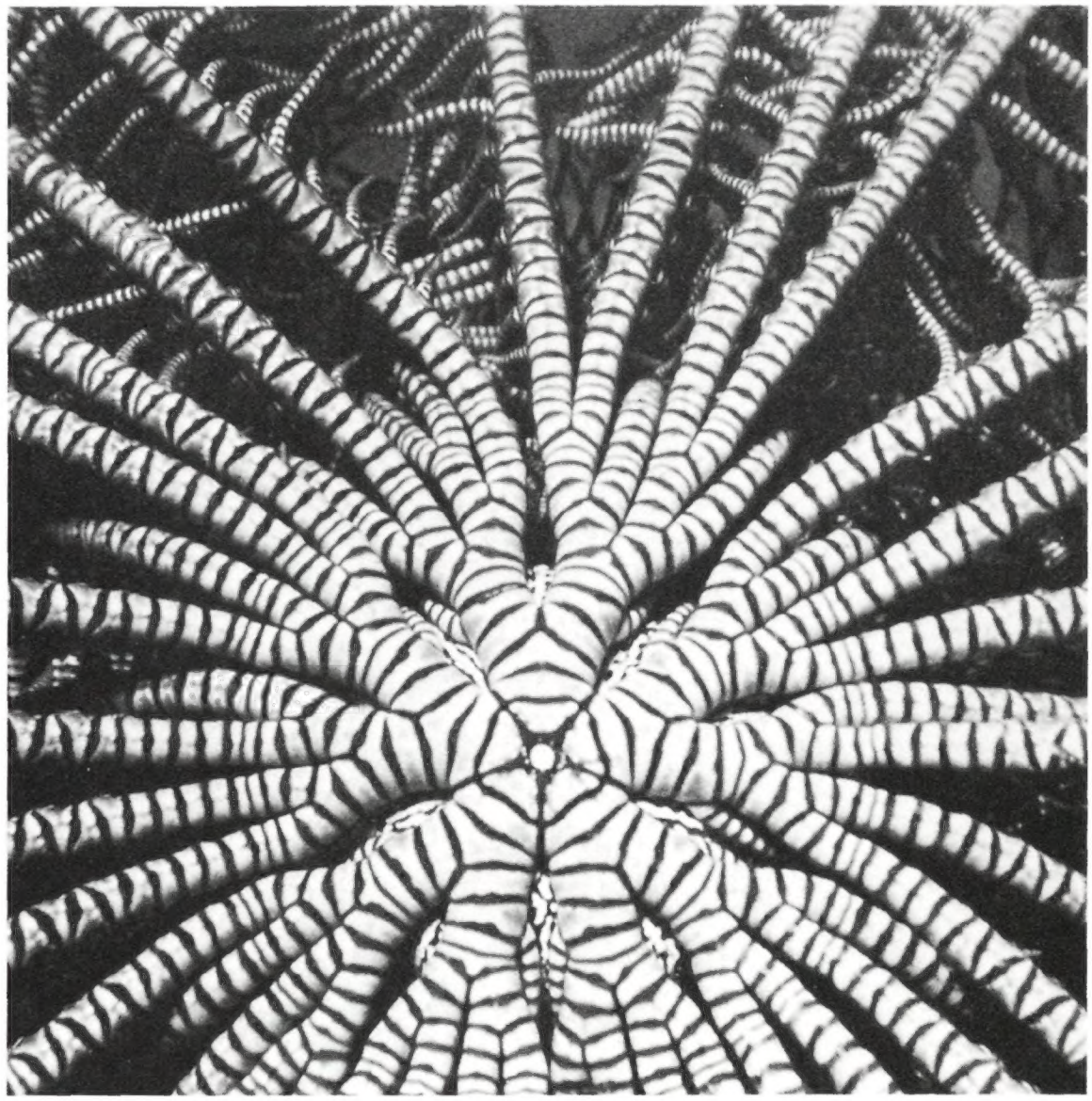
For most purposes, the slightly finer grain in Kodachrome 25 film—imperceptible except to a user like Professor Macurda—is outweighed by the speed advantages of Kodachrome 64 film. Graininess is best judged not from the fine detail but from the large uniform areas in a picture. Stay with Kodachrome film for finest grain. Both Kodachrome films can resolve 100 line pairs per mm for a test object of 1000 : 1 contrast, about half that for a more realistic 1.6 : 1 test object.

If you are one to go by numbers, we give you 125 line pairs per mm resolving power (for a 1000 : 1 test object) in the new Kodak Ektachrome films for process E-6. Process E-6 is swift and simple at the expense of more complexity we build into the film compared with Kodachrome film, for which the processing is not at all simple. With Ektachrome film you can do your own processing and show the slides within the same hour they were shot. The directions that come with the Kodak Ektachrome film processing kit, process E-6, even tell how to "push-process" for enhanced speed and contrast. If you'd rather do something else than process film, you can order "push" processing instead of regular if you need it.

The new ones have their nominal ASA speeds right in their names: Kodak Ektachrome 64 film (daylight), Kodak Ektachrome 160 film (tungsten), and, with less graininess than the Kodak high speed Ektachrome film (daylight) which it will replace, Kodak Ektachrome 200 film (daylight).

Versions of these films for use under exacting color balance conditions have the word "professional" in the name. These films require refrigeration until used and should be processed promptly after exposure to retain their "professional" status.

Both series of the new Ektachrome films are particularly good with flesh tones, chlorophyll greens, and wood browns (provided the one is kept refrigerated until an hour before use, the other *not* kept cold all the time nor left toasting in a car in the sun either). They make nice distinctions among the reds and oranges. They can be freely intermixed in a slide show with Kodachrome film. The difference between very good and very, very good won't jar your audience.



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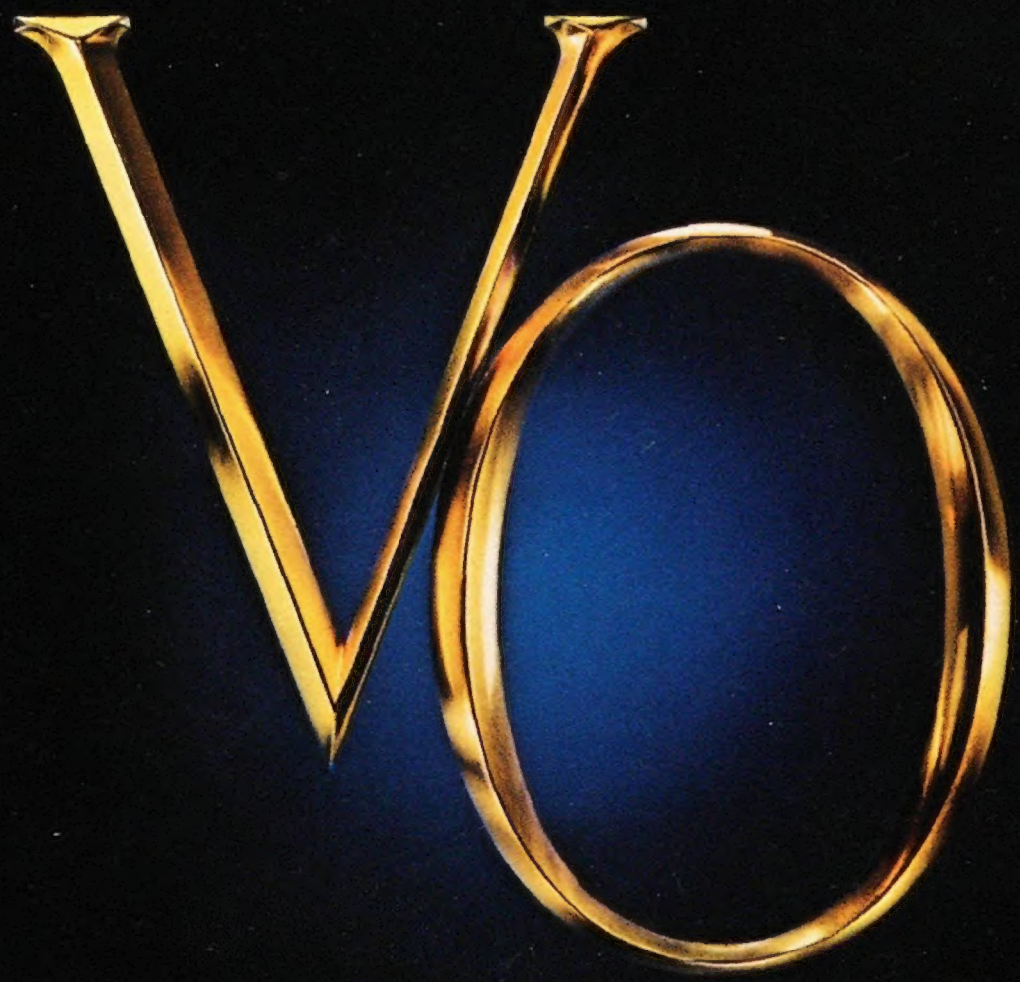
While you've been working your way up for all these years, we've been quietly waiting for you to arrive.



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Secretary Ripley's comments

The view from the castle

What is an Associate? Someone who can become part of a vigorous educational and cultural force everywhere in the land

When our Smithsonian Associates program was started in Washington in 1965 (before the creation of this magazine in 1970 made possible our spreading out across the country), it was a step toward realization of a dream of national public service: of continuing education, the exchange of information, TV programs, cassettes for home instruction, book programs. In addition we dreamed of doing something else, perhaps more intangible: to arouse interest in the continuation of learning. Now that the Associates have become national and there are a million and a half of you, that dream has begun to assume concrete shape. We are coming to realize that with you, the Associates, a dialogue will develop in which your part will be to express your interests and your needs.

This is dramatically evident after reading in the last months some 2,000 replies to a letter that I mailed to a random selection of Associates. I asked several questions: What are we doing and how does it seem? Is the magazine satisfactory, not only as an earnest of what we are all about, but as a vehicle for learning about museums and collections of art, history and the natural world? Does it pique your curiosity about what is all around us?

I was excited and heartened by the letters that came back. By far the greatest number said, "Go on, do more. Keep it up." That made us all feel that what we have been attempting has been positive and good, and worthy of our mandate: to promote "the increase & diffusion of knowledge among men."

What all this means, then, is that the Smithsonian Associates can play a genuine role in "diffusing" knowledge and enlarging the access to education. If this is so, all of you Associates have a stake in the success of the Smithsonian. Without the programs of the Institution, its storage bank of information and our ability to prepare it for your use, there would be little chance of realizing what I think is true: as the Smithsonian belongs to all of us, so should it be used for what it is, a veritable treasure house of knowledge as well as a storehouse of the gifts of private individuals over the generations.

It has always been our contention that to be a Smithsonian Associate is more than just to receive a beautiful magazine, more than to enjoy the other benefits of membership: the tours, the Court restaurant, the Lounge, the discounts on books and gifts in the shops.

In addition to all the support you have thus far given to the Smithsonian (and I might add to me personally), what else can an Associate do? I can think of a number of actions, most of which stem from the fact that by being an Associate you have joined a special community, a citizens' band, if you will. As a member you share in the responsibility of the Smithsonian to *be* the National Museum, not just a Washington institution but a cultural and educational force (of which your local museums are very much a part) in every corner of the land.

You can become spokesmen and activists, expressing to your local and national representatives your concerns about saving the best of the past, selecting what is worthwhile from the present, and from a synthesis of these judgments preparing for the future.

S. Dillon Ripley

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Around the Mall and beyond

I presume that this is being read (if at all) in the golden days of September. I hope it is cool and bright. It is being written in the wax-melting days of July, and it is hot, damp and miserable. The result of this time-step is that when readers (if any) are expecting facts and anecdotes as bright as the day, the writer is tempted to produce trivia.

To wit: There is a bicycle exhibit beside the pendulum in the Museum of History and Technology. It has a lot of great old bikes—penny-farthings and other boneshakers, and safeties and tricycles and stuff like that. Amy Carter showed up to look at it, along with a summer class she's attending, but since it's Washington policy now for the press to leave Amy alone in some sort of normality, I merely mention the fact without comment. Just a courteous smile. Hi there, kid.

The bikes remind me that the Smithsonian put on a Fourth of July bash all up and down the Mall near the Museum of History and Technology and among many attractions were the Wheelmen, a national organization of high-wheeled bike enthusiasts. "High-wheeled" is the correct name for a penny-farthing: a big wheel in front and a little wheel behind and a natural propensity to spill the rider forward, head over heels. The Wheelmen, wearing authentic bicycling uniforms of the same vintage as their bikes (the oldest dates to 1882), did little stunts and group formations on their lofty wheels, or "ordinaries" (below).

The Wheelmen were only part of the Glorious Fourth's attractions. There were also the Supercycles (who ride unicycles), model boats puffing around the pool in which the Calder sculpture rises (one ran aground on something; Calder Rock, I suppose), clowns, barbershop quartets, a Trinidad steel band, a couple of ordinary bands and a period for "social dancing," each of the minifestival's three nights, first in the manner of 1930 to 1950, next 1910 to 1930, last 1890 to 1910.

The crowds of people on the Mall at that time inspired me to learn what they eat when they just wander around outside and don't go into one of the Smithsonian eating places. Being a frustrated restaurant writer at heart, I've indulged myself at all the hot dog stands and written a report—"The Gourmet Guide

Wheelmen ride a family of "ordinaries."

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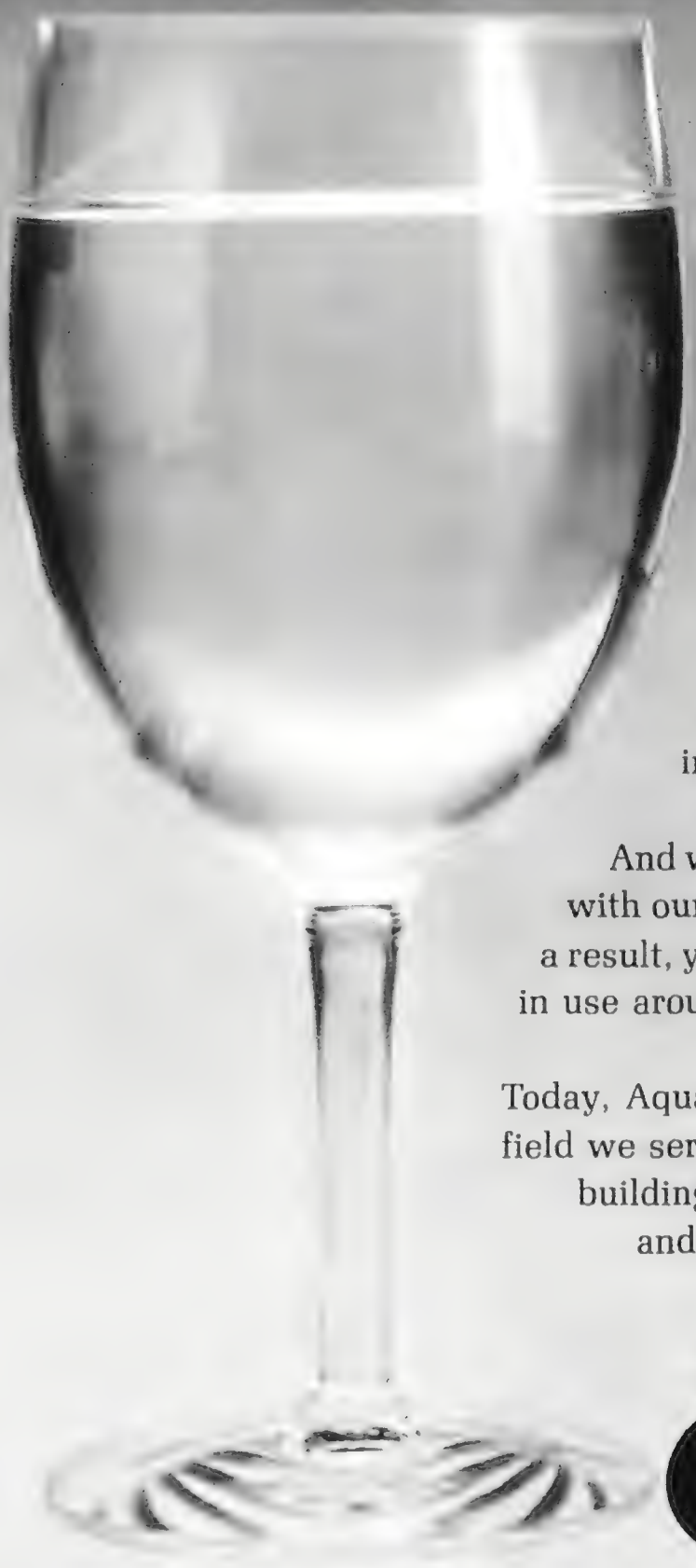
to Junk Food"—which I now present.

Outside three of the essential museums on the Mall—Arts and Industries, Natural History and History and Technology—are government-run booths which dispense essential foods for sightseers. You can buy a hot dog there and it is given to you wrapped in foil, modestly warm, untouched by catsup, mustard or any other helpful agent to make it more palatable. Mustard is generally available in a huge jug beside the service line, but you have to look for it. The service is normally friendly and helpful, but damned if they'll tell you about that jug of mustard. And without it, you've got slim pickings for 57 cents.

I must say the ambience is nice. You have the carousel playing old waltzes and marches and a bit of pleasant shade from the trees. You need a beer, but the government serves only colas and things like that, so you have to wander over to the court of the Hirshhorn Museum and Sculpture Garden. The beer's fine at the booth there, but a bit costly. However, the birds are fun. The English sparrows have taken over from the pigeons and continually drive them away from bits of biscuit. I don't like English sparrows much, but I hate pigeons—except one which I will tell you about—so I was pleased to see the sparrows being so plucky instead of concentrating on love. English sparrows are even more determined about love than are pigeons—and that's saying a lot.

For dessert, there is a cart in the Hirshhorn court which sells frozen strawberry yogurt. I didn't want any, but a spy tells me it's really neat, and I see no reason to doubt her.

If you have a yen for popcorn, you can get a small bag for 23 cents plus tax at the government booth, but the best popcorn in town is right by the Arts and Industries Building (sometimes in front of Natural History) in the antique popcorn wagon which was manufactured a few years ago by the Antique Popcorn Wagon Company. You look in and watch the guy popping corn and shoveling it into bags, and the bags are big. I measured mine and came up with 70 cubic inches. Figuring about two pieces of popcorn to a cubic inch, that's 140 pieces—quite a bit more than you get at the other place. Price: 40 cents. Expensive? Yes. Extravagant? No.



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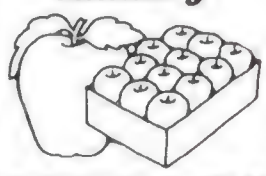
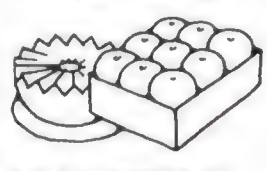
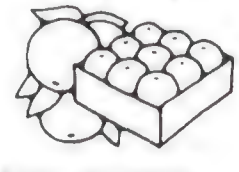
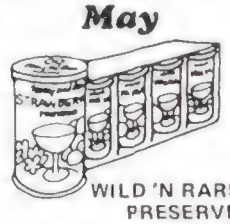
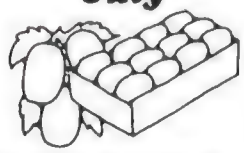
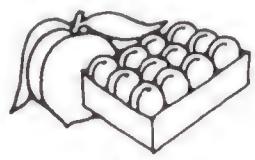
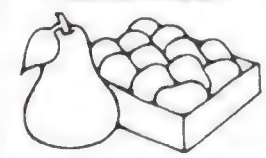
Christmas	January	February	March
			
ROYAL RIVIERA® PEARS America's rarest and finest fruit. So big and juicy you eat 'em with a spoon Net weight 6-3/4 lbs	CRISP MOUNTAIN APPLES Huge red rascals. Grown up here where the cold nights make 'em crackling crisp and juicy. Net weight 7-1/2 lbs	ROYAL GRAPEFRUIT Bigger'n grade A ostrich eggs, juicy as Oregon rain clouds, and so sweet they don't need sugar. Net weight 10 lbs	ROYAL ORANGES Juicy aristocrats descended from the fabulous Bahia oranges of Brazil. Sweet and tempting! Net wt. 5-1/2 lbs
April	**May**	**June**	**July**
			
HAWAIIAN PINEAPPLES Two hulapaloozers. Fully ripened the way mainlanders hardly ever taste 'em Net weight 9 lbs	WILD 'N RARE® PRESERVES Our prize-winning homemade pure fruit preserves. No artificial flavors, colors, or preservatives. Four 3/4-lb. tins	HOME-CANNED FRUIT Uncanny! Orchard fresh, in extra-heavy syrup. Baked Pears, Summer Delight Pears and Oregold Peaches. No. 2-1/2 cans. Net wt. 5-1/2 lbs	GIANT KIWI BERRIES Wonderful new fruit from New Zealand. Delicate strawberry-banana-watermelon flavor. Rich in vitamin C, too Net weight 2-1/2 lbs
August	**September**	**October**	**November**
			
EXOTIC NECTARINES Plum peachy. Big and blushing. A sure-fire summer sensation ... look good on the figure, too. Net weight 5 lbs	OREGOLD® PEACHES Family and friends'll never forget these huge Oregon beauties. We rush 'em harvest fresh. Net weight 6 lbs	ALPHONSE LAVALLE GRAPES Big, velvety black Belgian hothouse type. Make store-bought grapes look like birdshot! Net weight 4 lbs	ROYAL BEURRE® BOSC PEARS Smooth as butter, spicy sweet. We grow 'em here at Bear Creek where this extra-fancy fruit reaches its peak Net weight 6 lbs

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Across the Mall near the Museum of History and Technology are three matching carts that sell (1) "Quarter Dogs" named not for their price but for the quarter of a pound of beef that goes into each one—delicious—90 cents; (2) Michelob beer on tap at 80 cents a cup; (3) squishy ice cream, vanilla and chocolate, which that same spy told me was really neat. Service is spotty, and ambience is only fair because you end up sitting on knobbly concrete.

Over here, the pigeons beat up on the sparrows. I was disappointed at this resumption of normal pecking order, and then I met Big Red. He was a drunken pigeon. He had got into someone's beer cup and finished it off, it being a hot day, and now he had trouble walking. Concerned for him, I peeled off some bun from my quarter dog and tossed it to him. He reeled up to it, leaning on a wing, then stood on it. That puzzled him. He knew it was there somewhere, but he couldn't find it. He turned around, peering groggily in every direction, pivoting on the piece of bread, and finally gave up and trotted away.

As soon as he moved off the bread, of course, he rediscovered it. He stumbled back to it and was about to stand on it again when he decided to strike. Down came his beak—right on one of his own long pink toes.

Poor Big Red. With a little help from me, he got his bit of bun, then flapped up on the concrete beside me, looked at me ruminatively with a red eye and fell asleep. I left him there.

At the stand near that part of the Mall I bought a box of Cracker Jack, which I had not tasted since watching the Red Sox at Fenway Park in 1934. The box provided me with a miniature "Book of Records" which informed me that the world's tallest man had lived somewhere in Illinois and had a shoe size of 37 AA. Puzzling over this immensity, I came down hard on one of these little bits that you think are peanuts but turn out to be unpopped corn kernels and shattered a dear old molar that had been in my employ for years. As I age, I grieve more and more over the loss of any small fraction of this good old body.

The mention of bodies brings to mind a Roman sarcophagus which has been kicking around Washington rather aimlessly for 139 years. It has finally found

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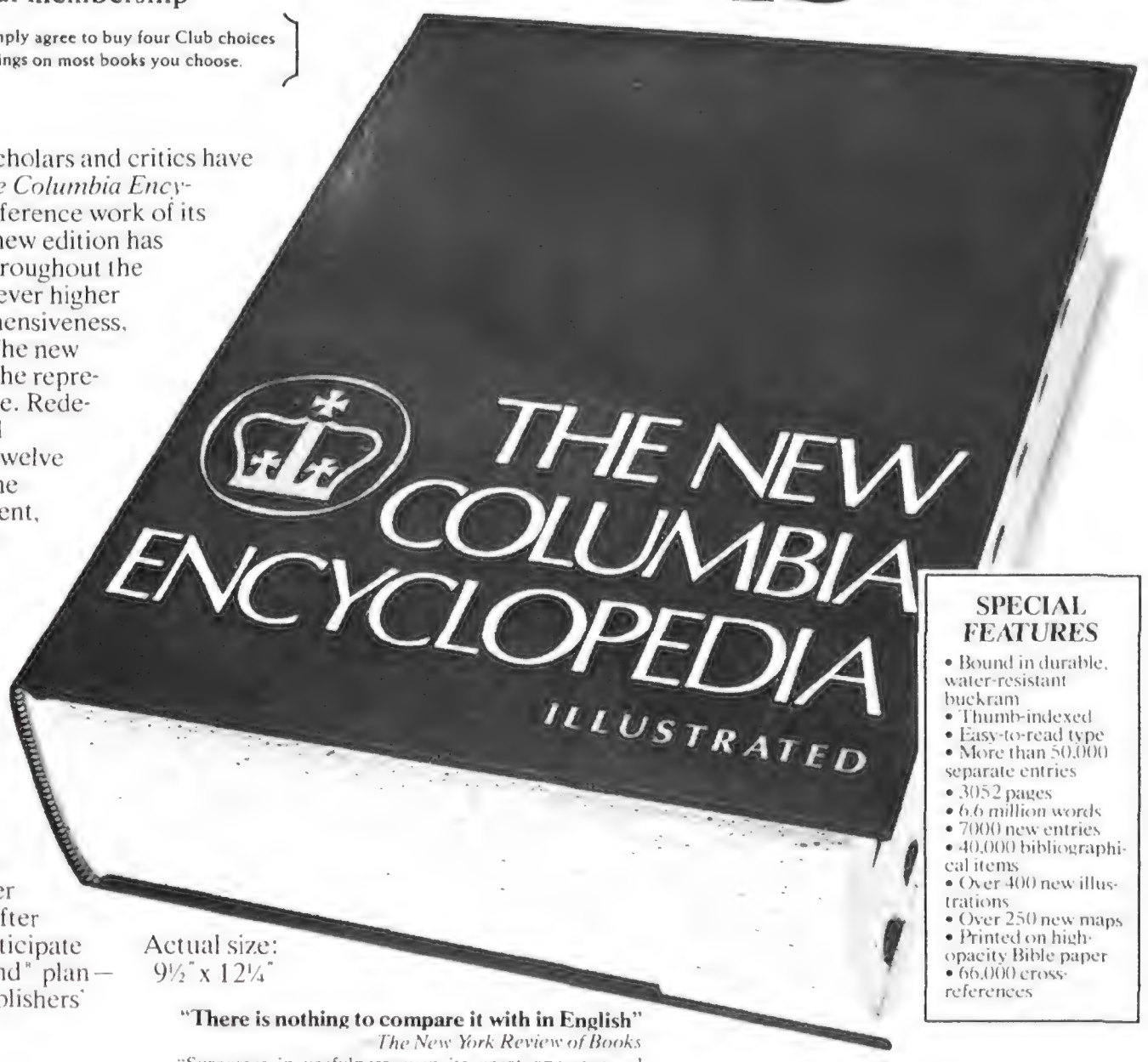

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a home of sorts at the Smithsonian, for the delectation of sarcophagus-watchers, and its story is unfolding.

In 1838, Commodore Jesse Elliott, USN, found two sarcophagi in Beirut and loaded them aboard the USS *Constitution*, "Old Ironsides" herself, as ballast. One had an inscription which seemed to indicate that the mother of a Roman emperor had been its designated occupant. The other was comparatively bare of ornamentation, which showed that its future tenant had not been named, or at least had not put his shingle out.

The theory in the States (later proved false) was that the unmarked sarcophagus was to be the eternal home of the emperor—the son of the lady whose name was engraved on its companion tomb. It was suggested that President Andrew Jackson be given the unmarked resting place, but he turned down the offer. Too imperial for his egalitarian soul.

The marked sarcophagus went to Bryn Mawr eventually and is still supposedly there to inspire the students. The other stayed in Washington, hanging around the outside of the Smithsonian Castle. Now, at last, it's worked its way over to the Museum of History and Technology and is holding court on the east terrace.

If one of you happened to fly west to east on American Airlines during a one-month period of 1976, you might remember a film called *Festival of American Folklife*. It was all about just that—the Smithsonian's folk festival—and it was aired on television during the summer-long Bicentennial folk festival, as well as regaling American's passengers. It won awards for its cinematographer/editor, the Smithsonian's John Hiller, and for its producer, the Smithsonian's Karen Loveland and an other virtuoso.

I talked to Karen, who is prettier than John, and she said that she got a real Emmy, "a big, flashy gold lady holding a ball in the air, with her wings spread out," and so did the others, thanks to the excellent judgment and critical taste of the National Academy of Television Arts and Sciences, Washington Chapter. Karen was also director and co-producer of that splendid film about 1876 that was described herein back in September 1976.

—Edwards Park

GREAT AMERICAN SAILING SHIPS

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Actual size of plate 8¾″ in diameter

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GREAT AMERICAN SAILING SHIPS

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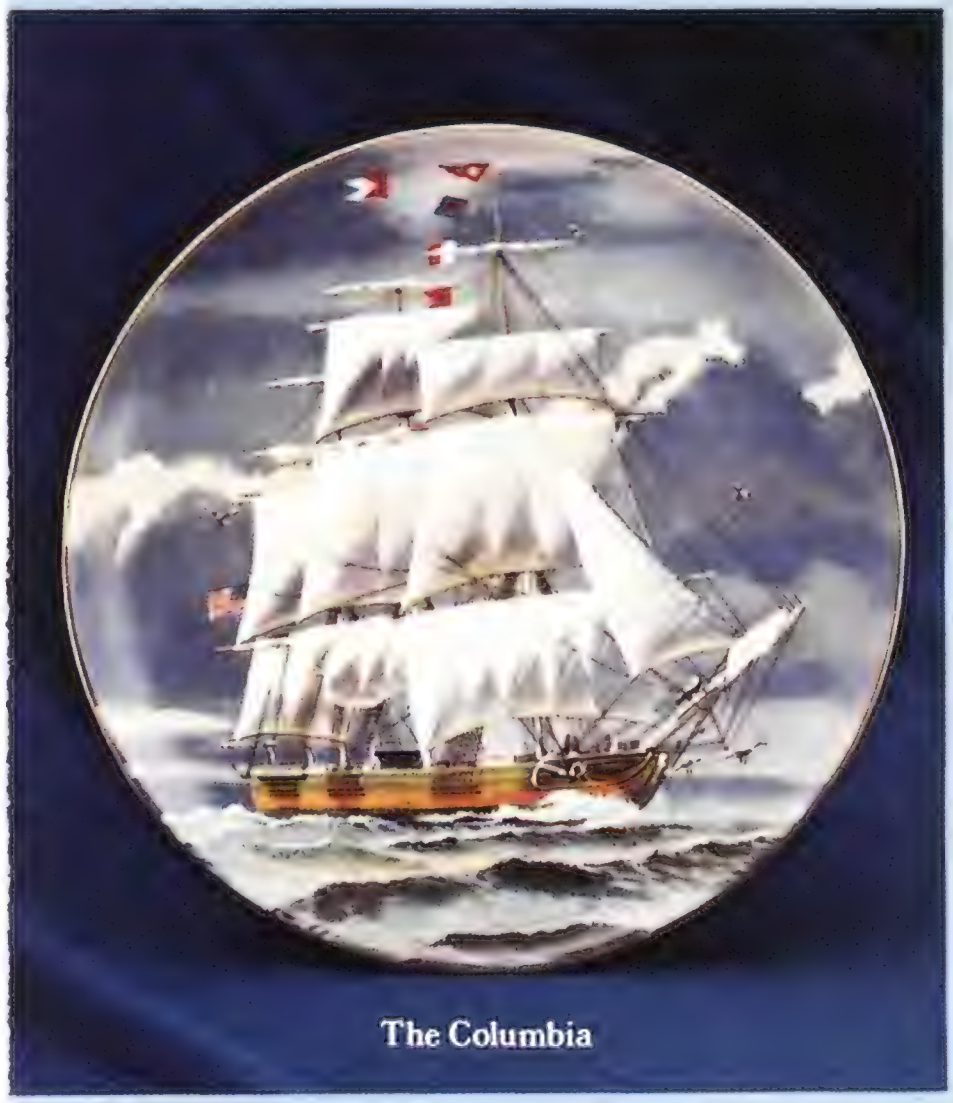

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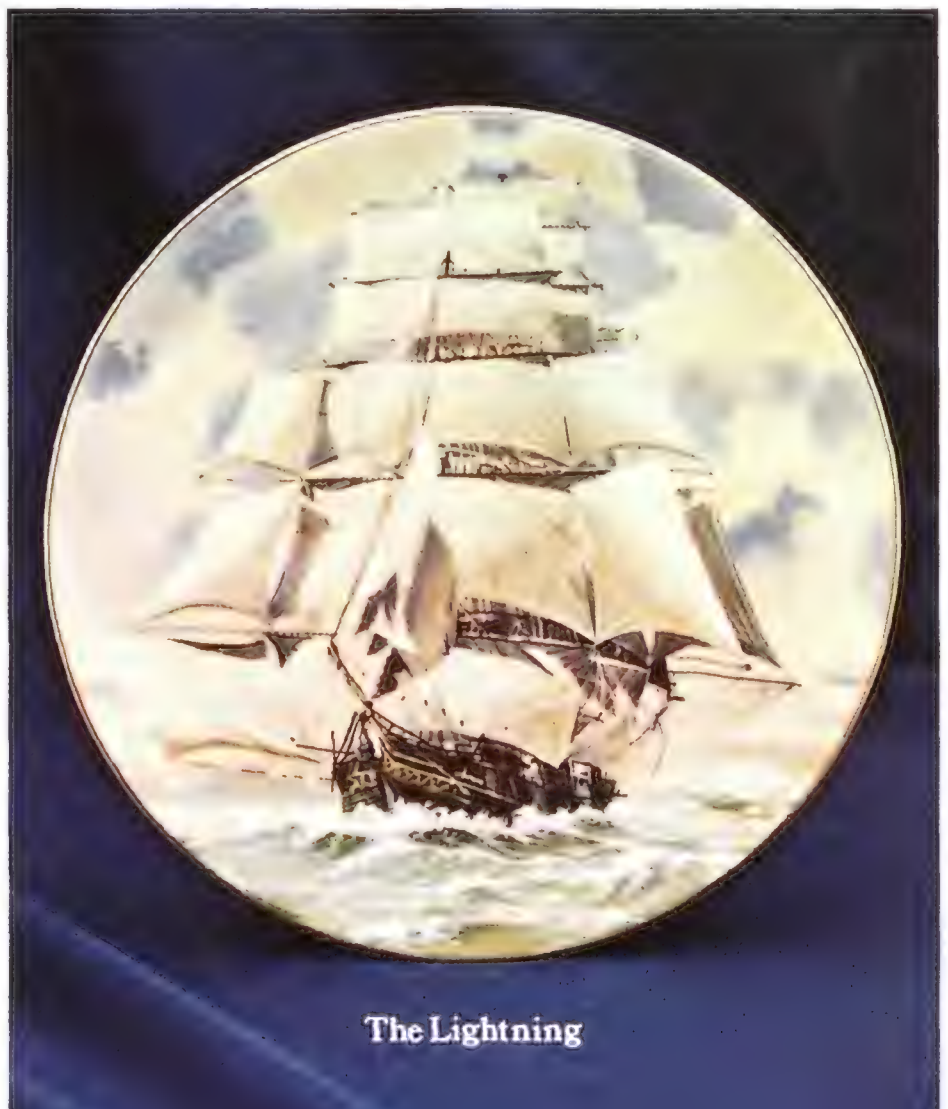

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Phenomena, comment and notes

The Sisyphean task of astronomy publishers, Mediterranean real estate, and a catastrophic theory

Textbook publishers hate astronomers. And no wonder. Astronomers render the textbooks wrong before the books spew off the press and collect in the warehouse, much less before they fall into the hands of those hypothetically eager children seeking precise knowledge of, say, the solar system. Indeed, if astronomy is to be taught at all—and why not?—it should be taught by means of loose-leaf sheets, updatable in weeks. Such a scheme might well add a little excitement to the subject: "Last week, children, you learned about Uranus. Well, the astronomers have found that our drawing is wrong. Uranus has rings, something like Saturn. Here's a new drawing of the solar system."

Earlier this year, while watching Uranus passing in front of a star, several astronomy groups observed what were later determined to be rings around the planet. Credit for the discovery has largely been attributed to James Elliot of Cornell University, but we must note with a bit of chauvinistic pride that Smithsonian astronomer Brian Marsden was instrumental in piecing together data from the observations to help scientists identify the rings.

But before the loose-leaf update is rushed off to the schools, there's news from Mars. A Viking spacecraft has sent back to the National Aeronautics and Space Administration composite photographs of Mars' tiny moon, Phobos. The photograph, computer-enhanced (right), shows a group of "chaotic linear grooves" nearly three-tenths of a mile wide and "linear features that appear to radiate from the large crater Stickney near the bottom." This leads NASA scientists to suspect that tidal forces of Mars and impact with "large debris" may be breaking Phobos apart, eventually to form rings around the red planet similar to those of Saturn and Uranus.

Now anyone hearing that will, if at all alert, cast a suspicious eye on our own moon, even though one might well expect that since we've already managed to leave some good old-fashioned litter on it, we know what we're dealing with: a stable Earth-moon system happily and eternally locked into its heavenly minuet.

Maybe not, two astronomers from the University of Texas suggest, according to *Science News* (Vol. 111, No. 23). The eccentricity of the Earth's orbit and the moon's mass (now slightly increased with flags and other detritus—though this is not a consideration) may mean that the Earth-moon system is unstable. In the future the moon may give up the dance and spin off to do its own planetary thing with the sun. Alternatively, it might fall to Earth.

Whatever its ultimate fate, the moon presently is moving away from the Earth at the rate of about an inch a year. As

Striations on surface of Martian moon suggest it may break up, form rings.

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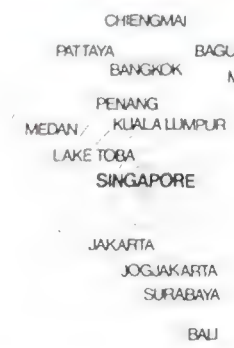

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On cultivating the vineyard for better wines.

Cultivating—which is simply the turning or loosening of the soil by mechanical means in order to control weeds and aerate the soil—might seem to some to be the most prosaic of all vineyard operations.

Yet, the truth is, we find its contribution to the production of fine wines far more complex than one might expect.

Weeds, to be sure, are undesirable. They compete with our vines for valuable nourishment and moisture in the soil.

But that is only one reason we take great care to manage an efficient and extensive cultivation program.

Frost Protection

Our experience shows that a moist, clean vineyard—one without weeds—also offers our vines measurable protection against morning frost during March, April, and early May.

Normally, during the day, the soil is warmed by the sun's rays. Then in the early hours before the following dawn, the heat that has been absorbed by the soil is released in the form of radiation, thus warming the vines above.

However, if there are weeds growing on the ground, they will shade the soil. Thus, its temperature will be cooler than if the sun were striking it directly.

Since the temperature difference between a clean vineyard and one with weeds can be as much as six degrees, and since in most instances a mere three or four degrees difference between the ground and the air is enough to protect our vines' tender young buds against frost damage, we do everything we can to keep our vineyards clean.

Our goal, of course, is to ensure that the tender buds ultimately develop into the best possible grapes for our wines.

Pest Protection

Cultivation in the early spring also helps us control insects and pests by destroying their breeding places, both above the soil and just beneath its surface.

In the Gallo vineyards, we might point out, we probably do more cultivating than normal simply because we prefer not to use herbicides when we can avoid them.

That same policy applies to the use of insecticides. We prefer natural controls.

For example, in one of our vineyards, instead of spraying to eliminate the destructive leaf hopper, we planted a number of wild blackberry bushes nearby to provide a refuge for several colonies of wasps.

The wasps then laid their eggs within the eggs of the leaf hoppers and thus prevented them from hatching.

In another case, rather than spray with an herbicide to control an obnoxious weed called puncture vines, we used weevils.

These natural enemies then burrowed into the germ of the puncture vine seeds and prevented them from sprouting.

By so protecting and nurturing our vines, we naturally improve the quality of the grapes that go into our wines.

Other Uses

We also rely on cultivation to enhance the effectiveness of our fertilization programs.

Fertilizers—except for nitrogen and boron—tend to become fixed in the surface soil. In order to be sure that these nutrients reach the roots of our vines, we disk them under the ground.

Then, too, during vineyard operations, soil often becomes compacted, a condition that could destroy the vine's fine root system.

To rectify this situation, we cultivate and loosen the soil, thus providing the roots some growing room. Proper cultivation makes stronger vines: and stronger vines make better grapes.

Why We Do It All

It is only by taking full advantage of all the opportunities available to us in the practice of cultivation—as in all the other facets of the art of viticulture—that we can hope to achieve our goal.

Which is, simply, to provide you with the finest wines we, or anyone else, can possibly produce.

Gallo Vineyards, Modesto, California

the moon recedes, its apparent size in the sky becomes smaller, so that in the not-too-distant future, as astronomers measure time, we on Earth will no longer see total eclipses of the sun. The moon will no longer cover the sun.

As the moon moves away, our days on Earth are getting longer, a thousandth of a second or so every century. Emmanuel Kant proposed in 1754 that the friction of rising and falling tides would slow the Earth's rotation, a phenomenon since verified.

What does it all mean? If we don't lose the moon one way or another, then in a mere 50 million years both the day and the month will be 47 of our present days long. And you thought today would never end.

Death of a theory

Pity the poor social scientists, seeking truly Newtonian, quantifiable things to say about the messy interactions of human behavior. With all their findings doomed to be considered "opinion" by hard-nosed, hard-science types, it is little wonder that they leaped upon a mathematical theory that recently erupted from France, long a stronghold of the notion that everything, including human nature, can be understood through the exercise of pure (i.e., Gallic) reason.

The mathematical theory is called "catastrophe theory" and it is supposed to render discontinuities—like stock market crashes and dog attacks—predictable. Using such terms as "manifolds of finite codimension," the theory is obviously beyond the ken of a lay reporter (though it sounds particularly apt for some social sciences). In any event, many non-mathematical scholars took up the theory in spite of a modest assertion by its creator, René Thom, that in the future "only mathematicians will have the right to be intelligent."

Now, however *Science*, (Vol. 196, No. 4287) suggests that this Napoleon of applied math may have no clothes on. A Rutgers University scientist, Héctor Sussman, finds that upon close inspection the models that catastrophe theory provides are logical catastrophes themselves. Catastrophists, Sussman says, use words in a proof in several different ways—in the dog matter, "attack," as used, means

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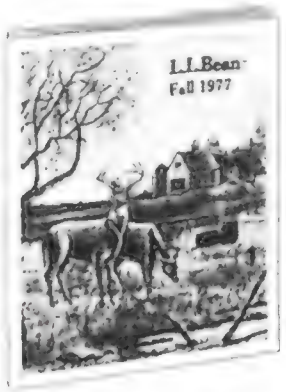

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two different things. Statements are "proved" by assertions, he goes on, that simply do not relate to the facts. The theory, he says, implies that a purely speculative stock market will never crash—a rather remarkable failure of historical understanding.

In any event, social scientists must, it appears, return to their lonely quest for the dignity of quantification, and we laymen, whose mathematical qualifications reside somewhere on the wrong side of a balanced checkbook, can happily dismiss catastrophe theory as a something else we need not feel guilty about not understanding a single word of.

A beach pest

Another series of catastrophes took place 5½ million years ago, turning what we think of as the Côte d'Azur into an arid salt flat. In fact it happened several times. It seems that layers of salt—very thick ones—have been found conclusively on the floor of the Mediterranean. The layers are interspersed with layers of fossil sea animals—ostracods and foraminifera. An international group of scientists suggest that in the late Miocene epoch the mountains of Spain and of North Africa were a-building, and the process successively opened and closed the "floodgates of Gibraltar."

When they closed, the sea would evaporate, leaving salt deposits. Then they'd open and in would come the ocean and its creatures. Drowned riverbeds around the Mediterranean suggest that the water level went well below sea level when the floodgates closed again.

The arid climate associated with the dry spells might have led to an increase in savanna vegetation in the entire region, and this, suggests *New Scientist* (Vol. 74, No. 1057), might have had something to do with the course of human evolution.

An intriguing thought. But lest owners of beach real estate on the Mediterranean grow too concerned about a return of the salt beds and an evolution of tourism away from their cabanas, the scientists estimate that the Mediterranean will take another 1,000 years to dry out if the forces of plate tectonics (or of some moronic engineer) shut the gates again.

—James K. Page jr.

Is America getting trapped by foreign steel... as we are by foreign oil?

In the oil-crisis winter of 1973-74, another crisis struck—the *steel* crisis. You don't remember America's steel crisis? Well, it was real. And it cost America's steel users a bundle.

The steel trap

Most foreign steelmakers are either owned, subsidized, financed aided and/or protected in one way or another by their governments. They don't have the same pressure we do to operate profitably or generate capital.

We believe that much of the steel being imported into the U.S. is being "dumped"—that is, sold at prices lower than those charged in the producer's own country, and usually below the foreign steelmaker's full costs of production. Dumping is illegal, but it has been hard to prove.

Here today, gone tomorrow

During periods of slack demand, foreign steelmakers push to maintain high production rates and high employment. They ship excess steel overseas, much of it to the U.S., priced to sell.

That's what happened in the sixties and early seventies. But, suddenly, in '73 and '74, the imported steel was needed "at home." The foreign supply dwindled to a trickle. Domestic mills worked overtime, but our production capacity just wasn't enough. Steel imports had skimmed off increases in the domestic demand for steel and reduced the profitability of the American steel industry.

So they lowered the boom

Foreign producers jacked their prices sky-high. And America's steel users could (1) cut back their manufacturing operations, or (2) pay an exorbitant price for foreign steel—when they could get it! It's estimated that in 1974 alone American steel buyers paid foreign producers $1.6 billion *over* the then current domestic market prices.

Will history repeat itself?

How much should this country rely on imports for its steel supplies? Things were bad in '73-'74, but they could get worse in the future. What could this country expect if we were as dependent on foreign steel as we are on foreign oil?

Free trade, yes! But fair!

Bethlehem Steel and the American steel industry are *not* "protectionist." We are *not* looking for permanent trade barriers against foreign steel coming into our home markets. All we're asking is a chance to compete on fair and equal terms here in our own country.

Washington must help

We urge the U.S. Government to insist on fair trading practices in steel, especially that steel imports be priced to at least cover their full costs of production and sale...to arrange for prompt temporary relief from the current excessive flow of steel imports... and to press for international governmental negotiations leading to an effective international agreement on steel trade.

If you agree with us about the seriousness of this problem, please write your representatives in Washington and tell them so.

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OPERATION

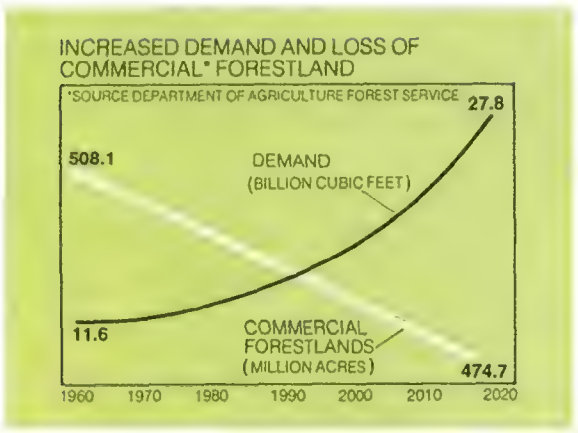
A report on how the forest industry is working to get twice as much wood from America's commercial forests. Year after year. Forever.

Wood is one of the world's most valuable resources.

It's America's busiest building material. It's also the basic ingredient in pulp, packaging and a thousand other products—right down to the paper this ad is printed on.

More Wood From Less Land.

But while world demand for wood is *increasing*, the amount of land available for commercial forests* is *shrinking*. Some of it has been set aside for parks and wilderness areas. Much of it has been turned into farms, freeways and new developments.



The chart above shows that U.S. consumption of all wood and paper products will double in less than 50 years. Thus the reason behind Operation Double Tree—the forest industry's name for intensive forest management that can double the amount of wood grown on a given piece of land. And do it in such a way that the forest remains a valuable part of the ecosystem.

**Commercial forest is described as that portion of the total forest which is capable of, and available for, growing trees for harvest. Parks, wilderness and primitive areas are not included.*

Double Tree is ambitious and is already working.

All across the U.S., forest product companies are working to double forest yield. In Oregon and Washington, forest product companies are predicting triple growth with genetically superior trees planted in prime forestlands.

Through thinning efforts alone, some companies in the Great Lakes States have increased diameters of remaining trees enough to double wood volume per acre over a 35-year period.

West

South

Double Tree isn't limited to large industrial tree farms. Individual woodlot owners from Maine to Georgia are putting idle lands to work, creating green belts that offer the twin payoffs of an increased harvest *and* eternal forests.

That may sound like a paradox, like eating a cake and having it, too. But unlike oil or coal, wood is one natural resource that is *renewable*. And modern forestry has found ways to make Mother Nature more productive.

Great Lakes

New England

Today's intensive forest management is rooted in nature's own ecological cycle. It begins with the harvest. Slower growing trees are thinned out. Others are harvested at peak growth. And every

The two Douglas firs to the right grew in the forests of the Cascade Mountains of Washington State. Both were harvested when they were 25 years old. The difference is, the larger one grew in an Operation Double Tree area, while the smaller one did not.

DOUBLE TREE

attempt is made to use every last part of the tree: tops, limbs and bark.

The New Forest.

But the real key is in the *new* forest. The new trees.

In some areas, foresters plant new seedlings by machine, or by hand. Helicopters are also used to re-seed. When young seedlings go in, the forest often gets a five-year head start over natural regeneration in the same area.

Many of them are of genetically superior stock, the result of years of selective "breeding." Seedlings by the hundreds of millions are grown in special nurseries. They're healthier, faster growers that mature faster and can be harvested sooner.

Some forestlands, such as those in the Northeast and Lake States, are left to Mother Nature because natural regeneration does a better job.

Wood is America's busiest building material.

Soil studies determine prime growing areas. When necessary, nutrients are added. And the young trees are protected from destructive insects, fires and natural enemies.

The result is a better quality forest, one that can be at least twice as productive.

Who Owns The American Forests?

Significantly, the principles of Operation Double Tree are being used on only a small portion of America's forestland. And good as Double Tree is, it might not be enough. Too much of the American forest is still under-utilized and under-productive.

Overall, industrial forestlands are working the hardest. Industry owns only 13 percent of the commercial forestland, but it provides almost 30 percent of the total harvest. Some 4 million private individuals own 60 percent. Government owns about 27 percent.

All of which means we must join to make the most productive use of our remaining commercial forestland. Industry has invested millions to make the concept a reality. But money isn't enough. Leaders and landowners alike must understand the problem. And, more important, the solution.

For more information, write for our free booklet "Managing the Great American Forest," American Forest Institute, P.O. Box 873, Springfield, VA 22150.

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These copies, often produced by the same techniques used for the originals, are made by artist-craftsmen working under the Museum's direct supervision. The care taken in production frequently limits the quantity, and the majority of reproductions can be bought only by mail or at the Museum. (Above: Hippopotamus, bright blue faience decorated with lotus flowers. Length 8", $19.75 plus $1.25 shipping.)

To receive all of the advance announcements to be issued during the next year, send the coupon below with one dollar to cover mailing.

You will receive immediately the 116-page Christmas Catalogue. The brilliant array of new presents includes an Egyptian jasmine flower necklace; a golden Buddha; a medieval silver bowl; stained glass; jade and bronze horses from ancient China; an 18th-century porcelain dinner service; new needlework kits from the *Unicorn Tapestries;* snowflakes, stars, and bells in gold and silver; and an unparalleled selection of Christmas cards. An additional 24-page full-color catalogue introduces the Museum's Costume Institute "originals"—line-for-line recreations of designs from the past which bring unusual flair to contemporary fashion. Among these is the first copy ever made of the fabulous Imperial Russian "100,000 gold ruble" shawl. This outstanding reproduction in fine wool challis, with its bold stripes and intricate floral patterns retains the more than 50 colors of the original. It measures 21" x 96"; the price is $35.00.

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Letters to the Editor

Mathew Brady

Dear Sir: Your eloquent black-and-white July Brady cover is a beautiful pictorial representation of what Carl Sandburg wrote in his poem *Grass:*

. . . And pile them high at Gettysburg
And pile them high at Ypres and
Verdun.
Shovel them under and let me work.
Two years, ten years, and passengers
ask the conductor:
What place is this?
Where are we now?

I am the grass.
*Let me work.**

John Johnson
New York City

Dear Sir: The photograph captioned ". . . But sometimes composition could be improved—a morbid task for a helper" is a fake, a cropped version of one of several posed at Devil's Den, Gettysburg, by Peter S. and Hanson E. Weaver of Hanover, Pennsylvania—probably following the dedication of Soldiers' National Cemetery. Live soldiers, presumably on hand for the ceremonies, were posed in different shots—whether as a prank or as a blatant attempt to deceive is not known. The two men standing among the "bodies" in the uncropped version are identified as doctors in William A. Frassanito's *Gettysburg: A Journey in Time.*
Kimball Clark
Arlington, Virginia
Mr. Clark is correct. Ed.

Dear Sir: The clarity of pictures taken by Mathew Brady with such crude

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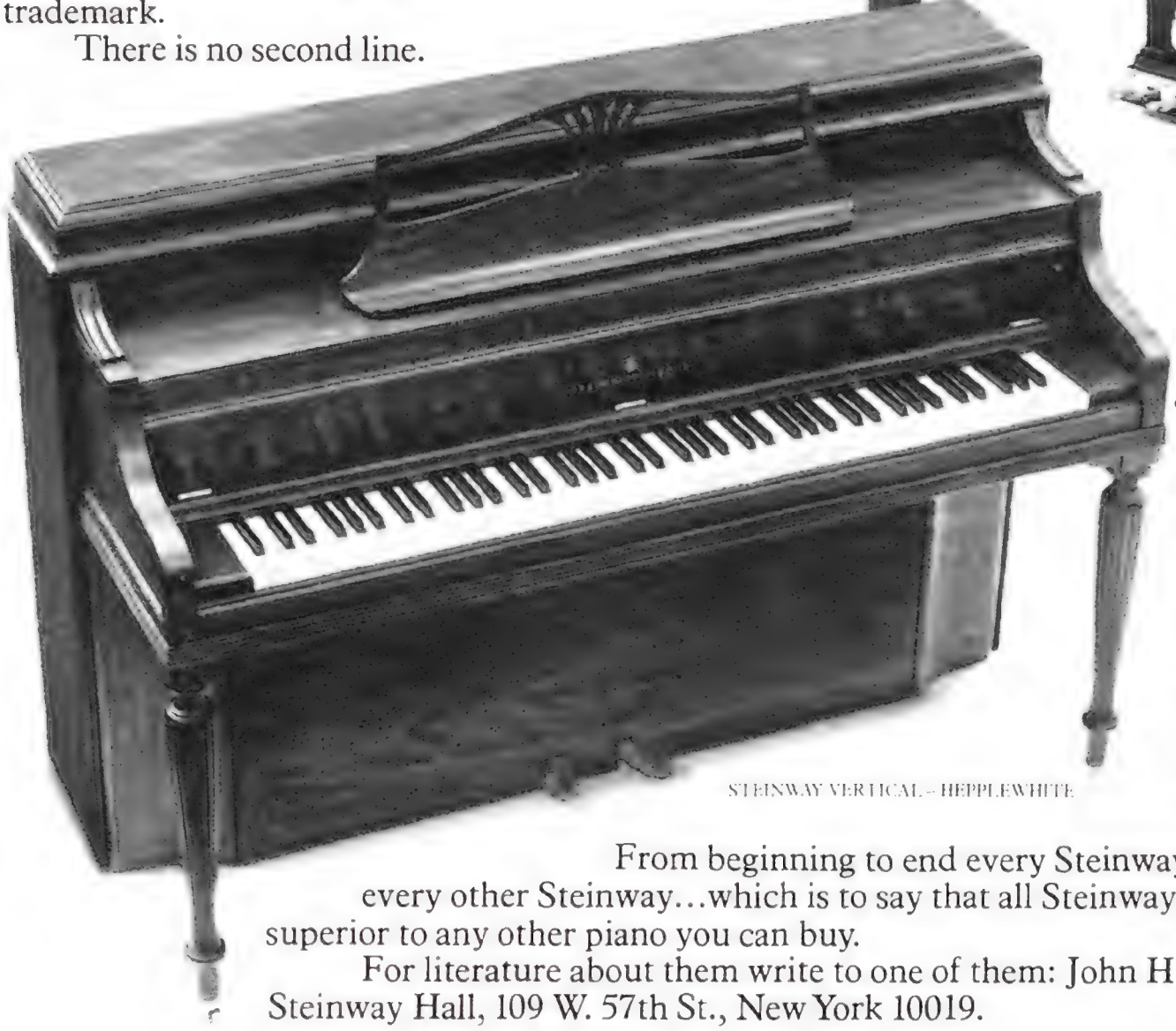

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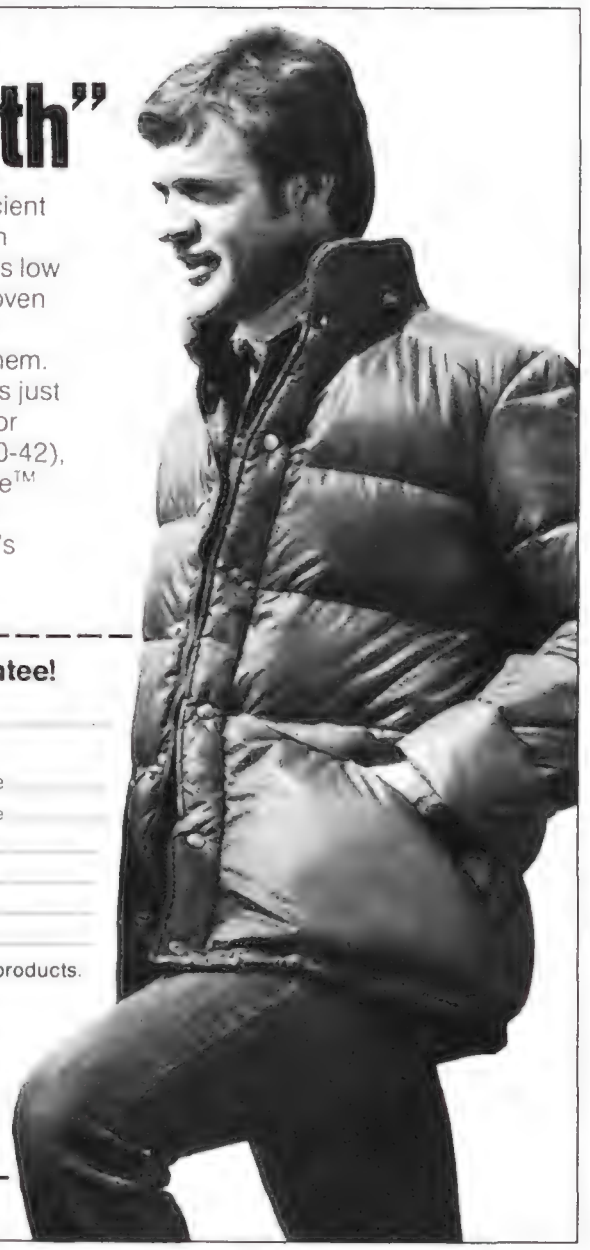

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equipment is remarkable. But I have not been able to find a picture of anyone smiling. I guess they didn't have much to smile about in those days.
John L. Bachman
Taneytown, Maryland

Women in government jobs

Dear Sir: Bravo! Bravo! for your article on the entry of women into federal jobs. As a career federal woman employee, I can fully appreciate what many of my predecessors went through. We have indeed "come a long way, Baby."
Harriet T. Siff
Virginia Beach, Virginia

Dear Sir: As a footnote to Ross K. Baker's article, I offer this quote from a letter written by Tennessee Congressman Leonidas C. Houk, dated March 22, 1882: "Gross has sent me word to have a man ready to take his place by Saturday [because of] my telling him, in reply to his demand for $600.00, that I could not pay him that sum. . . . I shall put Wickman in his place, and hunt up a lady for Wickman's place. I can get a lady for $350, and thereby increase the pay of the other clerks. . . ."
Rebecca Hunt Moulder
Tucson

Dear Sir: The wage paid women by the federal government sounds very small when not considered in the context of general wages and working conditions of the day. At the same time the District of Columbia Firefighters, who were on continuous duty—and dangerous—except for two meal hours per day, were paid less than $14 per week and had families to support. No doubt the women's federal paycheck looked like a lush remuneration to them. Elsewhere in the country, it was not uncommon for day laborers to be rewarded by one dollar for a long day's work. Some of us senior citizens recall many jobs for both men and women well into the present century that paid little more than women in government work received.
Warren Young Kimball
Jamestown, Rhode Island

Dear Sir: I am in full sympathy with the efforts of women to gain equal employment. However, many people in clerical occupations are skilled profes-

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Our new TX 9500II tuner is a perfect example.

Its front end features three newly developed field effect transistors that work to let you pull in beautiful FM reception no matter how far you live from the transmitter.

It has separate bandwidths for weak and strong stations. Which means you can filter all the noise out of weak stations without worrying about overfiltering strong ones.

And where most tuners have multiplex circuits that accidentally cut out some of the frequencies that add depth and presence to the music, the multiplex circuit in the TX 9500II preserves them. So the music begins to sound as if it's coming live from your living room, instead of from some radio station miles away.

Naturally, after developing a tuner this advanced, we had no choice but to create an amplifier that could match it.

That amplifier is our new SA 9500II. A fully integrated amplifier that's capable of producing a continuous power output of 80 watts per channel RMS into eight ohms, from 20 to 20,000 hertz, with no more than 0.1% total harmonic distortion.

In other words, an amp that cannot only reproduce the entire audible frequency range of every conceivable instrument, but an amp that can reproduce *all* music with a total harmonic distortion level well under what the human ear can hear.

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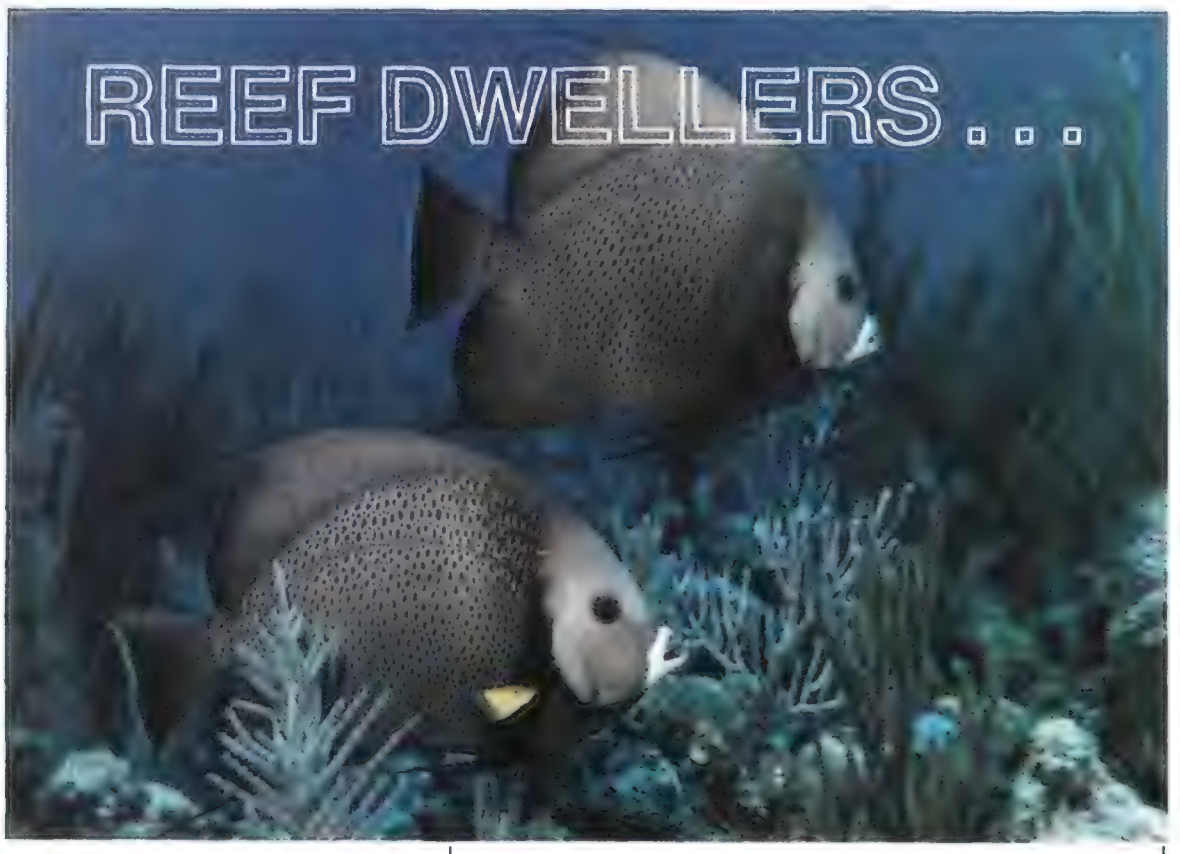

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sionals who enjoy their work and take pride in it. I resent the ever more prevalent implication that there is something degrading about such work. Secretarial and related positions are not the garbage dumps of the downtrodden or of those who bleed them. Those professions are still worthy of respect, necessary, and can be interesting and rewarding to one entering them by choice.
Pauline Griffin
Brooklyn, New York

Dear Sir: Your article has reference to Hugh McCullock. The correct spelling of the surname of our first Comptroller of the Currency is McCulloch.
Robert R. Dince
Associate Deputy Comptroller
of the Currency
Washington, D. C.
Mr. Dince is correct. Ed.

Indus culture

Dear Sir: In his interesting article, Dr. George F. Dales says he doesn't know what to make of the "conical piece of ceramic that looks like the hub of an airplane propeller." To me, it looks like a Shiva Linga, the phallic symbol of Lord Shiva, Hindu god of destruction.
Harish C. Saluja
Pittsburgh
This theory has been considered, and rejected, by many archaeologists. The Indus culture is at least a thousand years older than worship of Shiva. Ed.

Ambroise Vollard

Dear Sir: What a lively, rapturous image of Ambroise Vollard came from John Russell's gifted pen! The splendid illustrations added luster to a superb story. I read it over several times.
Kathryn Yochelson
Chevy Chase, Maryland

Dear Sir: In your superb story on the Museum of Modern Art's Vollard exhibition, the important painting by Renoir of Vollard, which you reproduced, was generously lent by E. V. Thaw & Co., Inc. Failure to pass along to you this credit was an oversight.
Elizabeth Shaw
The Museum of Modern Art
New York City

Male contraception

Dear Sir: Albert Rosenfeld's article gives one side of the fertility-control picture, namely, contraception. Natural family planning, while not contraception per se, is a form of fertility control. Its scientific basis is thoroughly established and is being taught all over the United States, across the world, even in the Third World to unlettered people.

The Department of Health, Education and Welfare has a $1.5 million research fund to study comparative methods of natural family planning.

The Reverend Ben Luther
Owensboro, Kentucky

Dear Sir: I was especially impressed by Albert Rosenfeld's article. Until the scientists achieve conclusive, effective and genetically safe results, I will gladly bear the burden of contraception.

Diane E. Welsh
Carmichael, California

Dear Sir: I wish to voice my opposition to this article. This sort of information might better appear in a medical journal. We humans do not have the right to tamper with the sex act designed to create life. We need to learn how to discipline and control ourselves.

E. L. McCarthy
Dubuque

Dear Sir: As I am a minister active in family planning, I know this article will be a valuable resource. And George Marsden's illustrations were terrific.

The Reverend David Rogge
New York City

Phenomena, comment and notes

Dear Sir: Re: "An additional cat for America," are you sure that hole in the ground has been trapping animals for 300 million years? If so, I'll be interested in seeing the dinosaurs they pull out.

James Thompson
Lincoln, Nebraska

That hole proved a natural trap for editors at SMITHSONIAN *as well.* Ed.

Ferries

Dear Sir: Here in South Dakota may be the last paddle-wheel ferry on the

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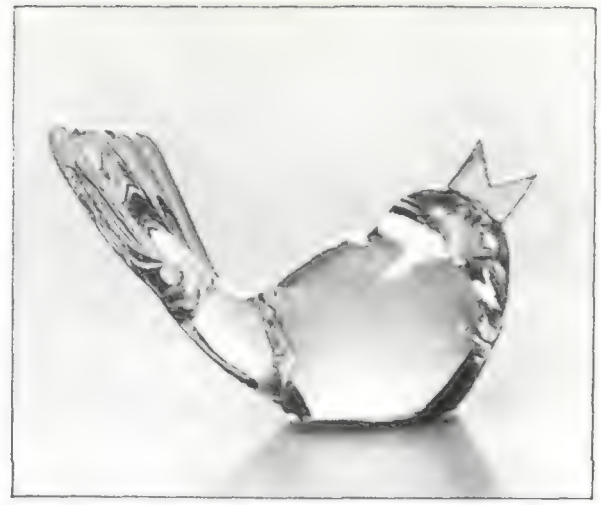

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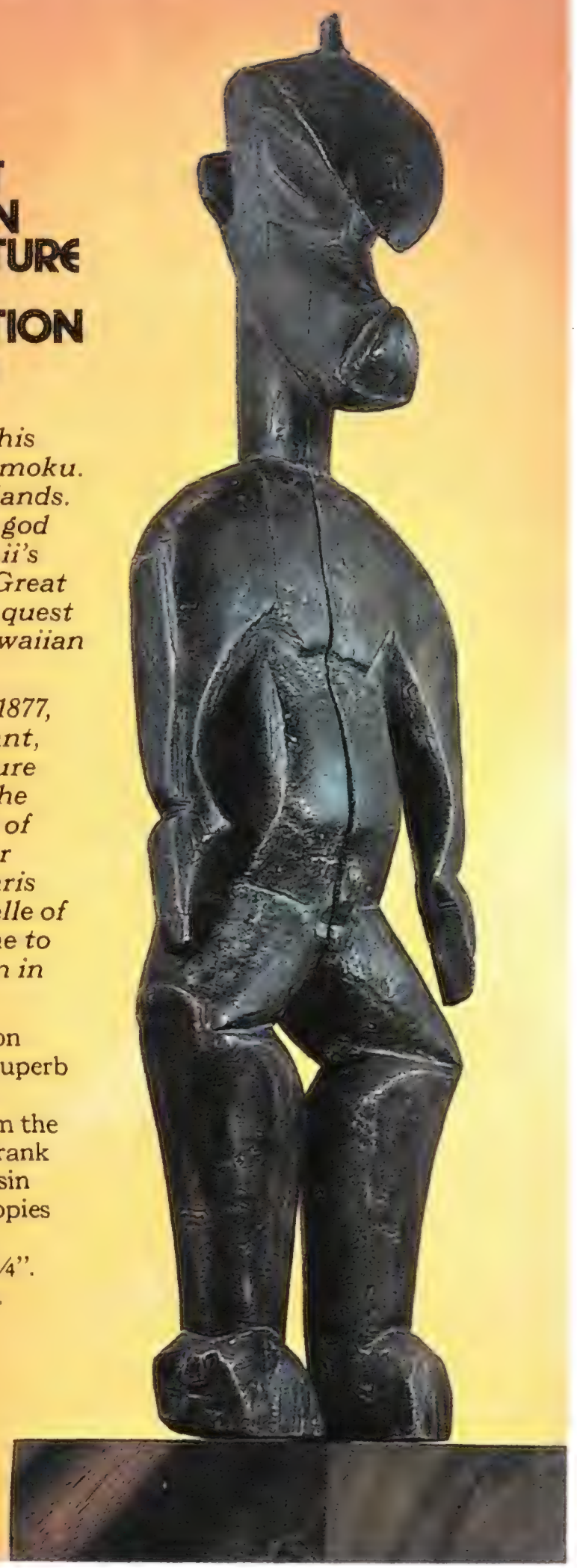

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Missouri. It is the *Running Water*, operating between Running Water, South Dakota, and Niobara, Nebraska. The 12-minute trip, skirting chalk cliffs along the north shore with their nesting swallows, saves motorists a 60-mile swing upstream from Niobara to the crossing at Fort Randall Dam, or a 35-mile drive downstream to the Gavins Point Dam. Local citizens who used to bring their children for ferry rides now bring grandchildren.

Durand C. Young
South Dakota Automobile Club
Sioux Falls

Dear Sir: Is the Millersburg, Pennsylvania, Susquehanna River crossing still alive? I used to expect Tom and Huck at the river bank with a mess of fish!

William C. Kessel
Hamburg, New York

Two stern-wheelers, the Roaring Bull *and the* Falcon, *still ply the river between Millersburg and Liverpool from dawn till dusk, April to November, carrying on a 200-year tradition.* Ed.

Dear Sir: As an old chin-on-the-rail ferry rider, I thoroughly enjoyed your article, but two that you left out came to mind—the old and elegant *City of Cleveland* and *City of Buffalo*, that operated for many years between those cities and Detroit. What beautiful and stately side-wheelers they were, the cynosure of all eyes!

At present the Canadian National Railroad operates a freight-passenger ferry up the coast of Newfoundland and Labrador, docking at minuscule Indian settlements. It's a wonderful way to experience icebergs, growlers and fields of pack ice as they migrate each summer down out of Davis Strait.

P. Earl Stephens
Center Line, Michigan

Dear Sir: We Texans hate to be left out! How about the Bolivar ferries, which connect Galveston Island with the Bolivar Peninsula? There are three, still resplendent in their Bicentennial paintwork, plus a brand-new one, plying Galveston Bay for the 20-minute voyage. As hundreds of sunworshippers, weekenders, residents and commuters will attest—what a way to go!

Mary Ann Bass
Houston

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Metro map

Dear Sir: Your map of Washington's Metro lines has its colors reversed. The newly opened line from National Airport to Kennedy Stadium with intermediate stops, including the Smithsonian, is the *blue* line and should have been colored blue. The first segment, running from Dupont Circle to Rhode Island Avenue, is the *red* line.

John V. Ryan
Silver Spring, Maryland

Mr. Ryan is correct. Our face is red—and blue. Ed.

View from the castle

Dear Sir: Your comments regarding cars of the future deserve a reply. Let me point out that General Motors alone, between 1976 and 1980, will have spent about $15 billion to design lighter, smaller, more fuel-efficient automobiles.

Frank R. Faraone
General Motors Corporation
Washington, D.C.

Yaddo and MacDowell

Dear Sir: I was excited and pleased to read about Yaddo, the wonderful retreat for writers and artists. It brought back to me the Fifties when such a place existed at the home of Ernest Thompson Seton, just outside of Santa Fe, New Mexico. Not on such a grand scale, but meaningful, nonetheless. Thank you very much for the wonderful journey back.

Frances Rich-Pepmueller
Albuquerque

Dear Sir: William F. Claire's article justly extols the MacDowell colony and Yaddo. What is less well known is that the Virginia Center for the Creative Arts, now in its second summer at Sweet Briar College, Virginia, has taken a new step in this country by placing a community of professional artists at a liberal arts college.

Mary Hosmer Lupton
Charlottesville, Virginia

Dear Sir: You forgot about us—here in Alabama.

Ann T. Davis
Creekwood Colony for the Arts
Hurtsboro, Alabama

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Perhaps even more noteworthy: it was the day Cutty Sark landed in America. A Scots Whisky already legendary in other civilised parts of the world.

Scotch had been imported into this country before, but had also been largely ignored. Cutty Sark, however, with its particular smoothness, soon captured a large and loyal following of Americans with good taste.

Today, wherever you go in America, you will find the bottle with the famous ship "Cutty Sark" on the label. And the distinctive Scots Whisky inside.

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By Robert Campbell *First of two parts*

The interaction of two great rivers helps sustain the Earth's vital biosphere

The Mackenzie, a 'young' basin, already exerts a marked influence on climate, fisheries, wildlife and the ocean currents

The calm of these frigid waters is broken only by the passage of occasional canoes or tugs and barges.

"Once a photograph of the Earth, taken from the outside, is available—once the sheer isolation of the Earth becomes plain—a new idea as powerful as any in history will be let loose."—British astrophysicist Fred Hoyle, 1948

When Neil Armstrong climbed down from the *Eagle* and set foot on the moon, he proclaimed: "That's one small step for a man, one giant leap for mankind." We understood his remarks as the simple eloquence of an explorer who had attained his and his country's objective. But such enterprises are deceptive; as often as not it is the unexpected dividend that proves more important in the long run. In this case it wasn't just the landing, but *the view back* that was significant.

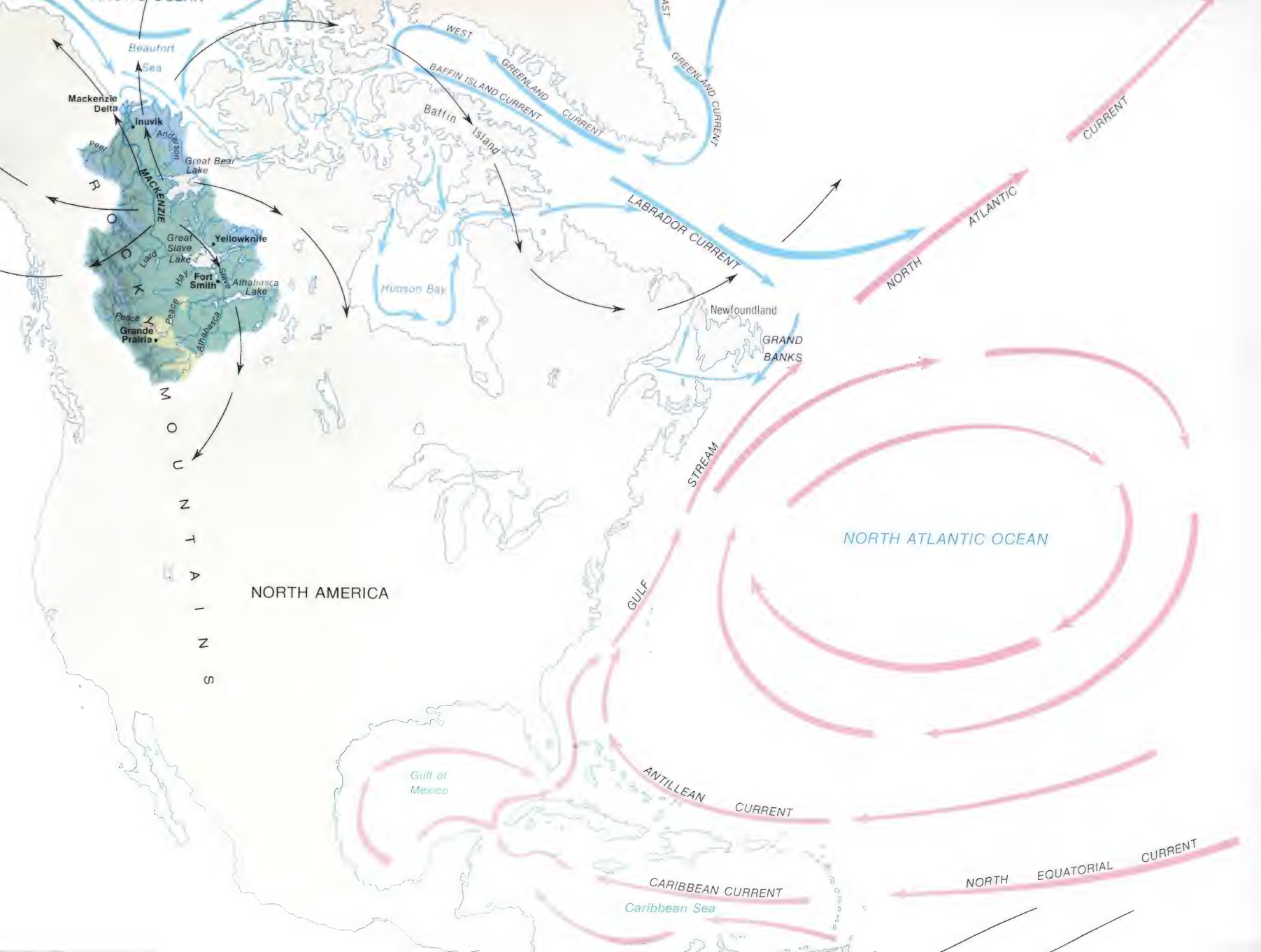
For the first time, through the eyes of the astronauts, we saw our true condition as passengers aboard a celestial ark, spinning through a perhaps deceptively lifeless void on a planet orbiting a star of quite indifferent magnitude, one sun among 100 billion others in our galaxy, itself but one of billions of galaxies in the universe. The giant leap could be seen as a blow to Man's ego.

But it is also leading us in stages to a new awareness of our role as an outpost of life, a vanguard of consciousness in this part of the galaxy. It has taken three billion years for life to attain this degree of self-sentience, and we cannot know where it will lead. The view from outside forces us to consider the short-term global impact of our deeds and even to foresee their ultimate consequences.

Michael Collins, who piloted the command module while Armstrong and Buzz Aldrin descended to the moon, and who is now director of the Smithsonian's National Air and Space Museum, declares that one word and one thought dominated all other impressions of the Earth as seen from space. The Earth was *fragile,* and the crew felt a certain uneasiness when, on occasion, their home base drifted out of view.

The Earth's cargo of living things is fragile, too, and though possibly not unique in the universe, it

In short Arctic summer the rough-legged hawk makes nest, lays eggs while river is still icy.


Beaufort Sea
Mackenzie Delta
Inuvik
Peel
Anderson
Great Bear Lake
MACKENZIE
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Yellowknife
Liard
Hay
Slave
Fort Smith
Athabasca Lake
Peace
Grande Prairie
Athabasca
Hudson Bay
Baffin Island
WEST GREENLAND CURRENT
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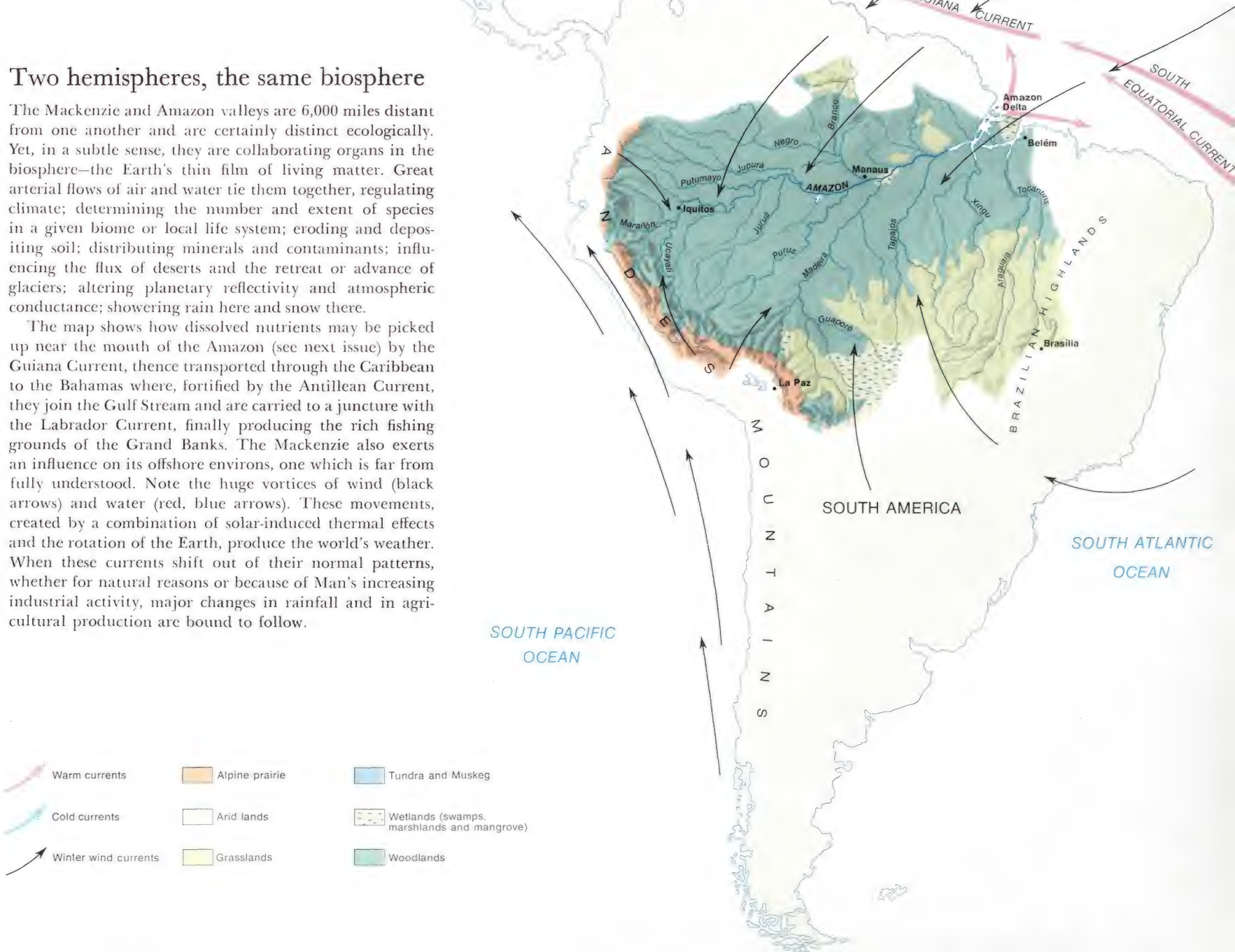
NORTH ATLANTIC OCEAN
GULF STREAM
NORTH AMERICA
Gulf of Mexico
ANTILLEAN CURRENT
CARIBBEAN CURRENT
Caribbean Sea
NORTH EQUATORIAL CURRENT

Two hemispheres, the same biosphere

The Mackenzie and Amazon valleys are 6,000 miles distant from one another and are certainly distinct ecologically. Yet, in a subtle sense, they are collaborating organs in the biosphere—the Earth's thin film of living matter. Great arterial flows of air and water tie them together, regulating climate; determining the number and extent of species in a given biome or local life system; eroding and depositing soil; distributing minerals and contaminants; influencing the flux of deserts and the retreat or advance of glaciers; altering planetary reflectivity and atmospheric conductance; showering rain here and snow there.

The map shows how dissolved nutrients may be picked up near the mouth of the Amazon (see next issue) by the Guiana Current, thence transported through the Caribbean to the Bahamas where, fortified by the Antillean Current, they join the Gulf Stream and are carried to a juncture with the Labrador Current, finally producing the rich fishing grounds of the Grand Banks. The Mackenzie also exerts an influence on its offshore environs, one which is far from fully understood. Note the huge vortices of wind (black arrows) and water (red, blue arrows). These movements, created by a combination of solar-induced thermal effects and the rotation of the Earth, produce the world's weather. When these currents shift out of their normal patterns, whether for natural reasons or because of Man's increasing industrial activity, major changes in rainfall and in agricultural production are bound to follow.



necessarily means a great deal to us. Indeed, such an array of organisms, great and small, diverse in form and habit, filling every niche from pole to pole and from sea bottoms to mountaintops, could not have been imagined or invented; it could only have evolved. These myriad beings are most intricately interdependent, woven together into complex patterns precious little is known about. They work out their destiny within a life zone of air, water and soil just a few miles thick, known as the biosphere. Because no species can exist apart from the web of life, the biosphere is not unlike a single giant cell, unimaginably sophisticated, delicately balanced and surprisingly vulnerable to the works of Man. In terms of global dynamics, it encompasses the oceans, the atmosphere, the land and the great rivers, receiving from them the elements and compounds needed to sustain life—nitrogen, oxygen, carbon dioxide, water vapor and many others. The whole system is a closed loop; it is anything but a haphazard arrangement. The "disorder" we see in nature is highly deceptive.

The Earth's first atmosphere, originating along with the planet itself about 4.5 billion years ago, may have consisted largely of ammonia, methane and water vapor—products of intense volcanic activity and boiling seas on a young and very hot planet. But after a billion years or more of cooling, shrinking and settling, rudimentary forms of life began to appear in

Robert Campbell wrote the script for a one-hour film, The Biosphere, *scheduled for release this fall by the National Film Board of Canada.*

Seasonal freezing, defrosting and buckling of permafrost creates a pattern of polygons.

Diffuse light of the midnight sun glares from Mackenzie delta oxbows and lakes, providing foreshortened season of procreation and growth for migratory birds, plants and hardy animals.

the primordial waters, followed by simple organisms capable of using the sun's rays for photosynthesis. The oxygen generated in that process began to diffuse into the air, and when it reached about one percent of the current level, ozone was produced in the upper atmosphere by electrical discharges, ultraviolet radiation from the sun and various other high-energy interactions.

The accumulating ozone shield had a profound impact on the evolution of life. It screened out most of the ultraviolet rays which are destructive to living organisms, while permitting visible light for photosynthesis to pass through. Life could now proliferate in tidal basins and even survive on land. For eons, oxygen-respiring plants and carbon dioxide-exhaling animals interacted, eventually giving the air its present mix of these two components, vital to life forms.

In turn, the atmosphere is a major circulatory system for living things. Great currents continually mix cold air from the poles and hot air from the tropics. Without this heat exchange, the polar regions would be frozen solid the year around and the tropics would be burned crisp. The midlatitudes, of course, are more stable and suitable for crops than they would otherwise be.

The dynamic role of the atmosphere is augmented by the oceans and river basins. The rivers distribute mineral-laden sediment along floodplains, providing soil which, in one way or another, sustains the creatures of the land. The nutrients eventually work their way down to the estuaries and deltas where nearly all oceanic life originates. Then they are dissemi-

Ptarmigan cock, a feather-footed northern grouse of the genus *Lagopus,* is white in winter but a barred or wavy gray or brownish in its summer plumage. This individual is starting to molt.

nated by perpetual ocean currents across the face of the globe.

It is only now, from space, that we have actually begun to see these global forces at work. With the assistance of satellite infrared and ultraviolet photography, radar scans and computer-enhanced images, time-lapse pictures show hurricanes roaring out of the tropical Atlantic, typhoons churning up the Pacific and cold fronts traversing the United States. They even show local thunderstorms. The circumpolar, Japan and Indian Ocean currents are all obvious. If the view from deep space brought home the solitary nature of the Earth, these close-ups tell us that its life-support mechanisms are fully integrated.

An ecosystem under the gun

Since a major question facing ecologists today is how the details work, we are focusing here on two great rivers, the Mackenzie in northwest Canada and the Amazon of Brazil. The Mackenzie drainage basin stretches into northern British Columbia, Alberta, Saskatchewan and a large portion of the Northwest Territories. The river flows to the northwest, past the Arctic Circle, to a delta on the Beaufort Sea at the edge of the Arctic Ocean. The Amazon is the largest river in the world, draining nearly the whole upper bulge of South America. Some tributaries rise in the Andes Mountains, which rim the western edge of the continent in Bolivia, Peru, Ecuador and Colombia; others flow from the highlands of Venezuela and Guyana on the far north and from the Brazilian highland areas on the south. Thence the waters converge in an eastward, irresistible flow across the whole of Brazil, terminating in the tropical Atlantic. A fifth of all the fresh water poured into the oceans of the world flows from the mouth of the Amazon.

Though these two river complexes lie 6,000 miles apart, they are by no means entirely independent of each other. There are not only atmospheric and oceanic connections, but distinct, though somewhat tenuous, biological links as well. Intercontinental voyagers like the Arctic terns and golden plovers habitually fly back and forth between the northern and southern extremities of the Western Hemisphere, sometimes stopping over in the Amazon region briefly. Thus if either basin were substantially developed, the impact on avian life forms in the other might be considerable.

The Mackenzie watershed drains 20 percent of Canada—well over 700,000 square miles of territory —bounded on the west by the northern reaches of the Rocky Mountains with the Mackenzie and Richardson ranges above them, and on the east by high plateaus of Precambrian rock. Most of this vast area

Once fledged, wary-looking peregrine falcon nestling will spend the winter in tropical America.

Like that of other raptors, this rough-legged hawk's menu helps to maintain balance of nature.

Young snowy owl doubles its weight every ten days in preparation for first solo flight and freedom.

This weasel's two-tone warm-weather pelage enables it to sneak up on squirrels and lemmings.

Red fox, making morning rounds in search of tasty small game, peers from a tangle of vegetation

is typical northern bush country, with bogs and marshes along the fringes of lakes, a variety of shrubs and herbaceous plants farther up, tracts of deciduous forest in the higher valleys and finally, on the mountain slopes, stands of conifers.

As one moves north, however, the forest thins out and is replaced by tundra, a new ecosystem which began to take shape about 10,000 years ago after the glaciers retreated. Except for a few fragile inches of poor soil at the top, which thaw during the brief summer, it is a solid blanket of permafrost. The scars cut into the tundra by Man can take decades or centuries to heal.

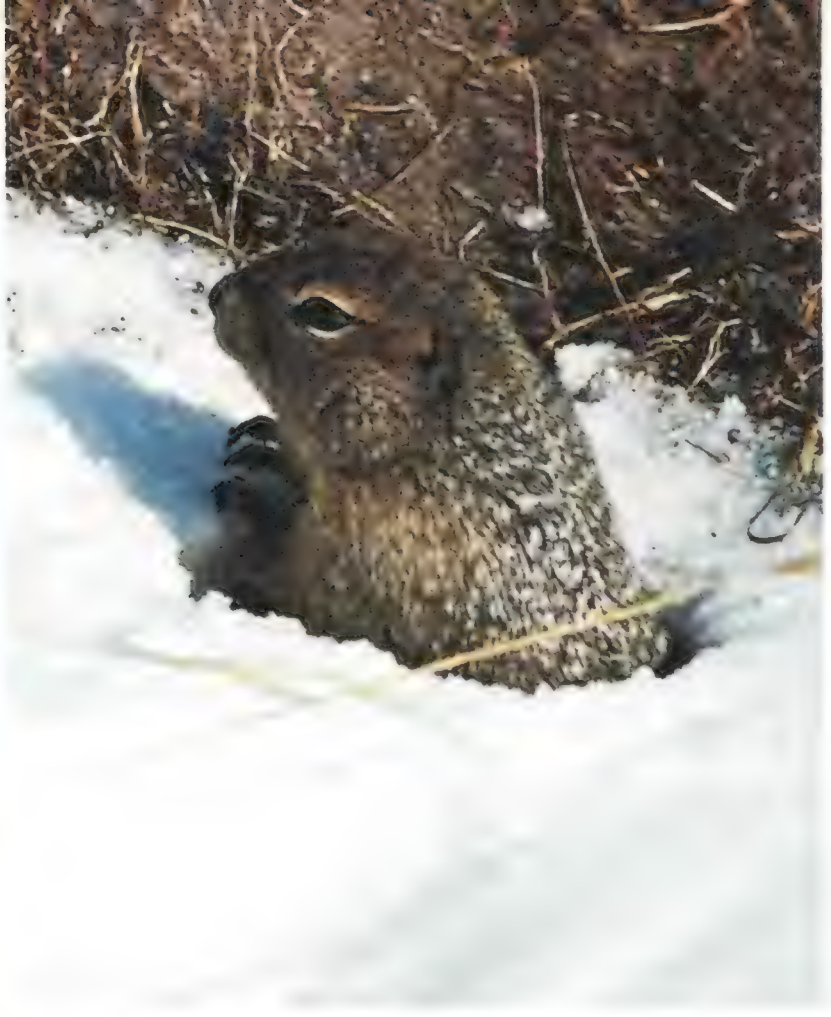
Here and there among the lakes and meandering streams weird geometries appear on the terrain, created by repeated thawings and freezings of subterranean wedges of ice. Sometimes the ice breaks through the surface in cone-shaped, earth-covered formations called "pingos," but otherwise the surface is monotonously flat. Lichens and mosses, grasses, sedges and a surprising number of flowers have established a foothold, but shrubs are dwarfed, with shallow, spreading root systems and small, leathery leaves. The Arctic willow is ankle-high. Many plants have evolved protective mechanisms, including densely matted hairs, to shield them from the cold. The tundra becomes almost lifeless in the High Arctic. But on the 5,000-square-mile Mackenzie delta a rich load of nutrients and higher temperatures caused by the water ensure vast expanses of marsh vegetation, shrubs and spruce forest. It is a true oasis.

In late April, in the southern reaches of the Mackenzie basin, snow and ice begin to melt. This thaw progresses steadily northward, reaching the delta between late May and early June. Gradually the ice cracks and splinters across the whole area and melting snow begins its descent from the western mountains. The cascade grows in intensity, finally converging on the great river—chunks, fragments, slivers, minimountains, floes as big as islands. The mass surges, snaps and grinds its way downriver, and woe unto anything that gets in its path.

The role of these dramatics in supporting the life of the biosphere is comparatively straightforward. In winter, on slopes all across the watershed, water freezes in rock crannies and fissures. It expands, shattering the rock into smaller and smaller fragments with each season. Soil-sized particles are produced and carried downstream in the spring runoff, to be deposited on the broad floodplain below. (Some particles small enough to be picked up and carried by the wind produced huge deposits of loess during the Ice Age.) At the same time the silt-laden waters are highly abrasive, eroding and leaching out elements which all living things need for growth—iron, calcium, sulfur, phosphorus and some that creatures like Man require in trace amounts, such as cobalt and magnesium. The cascading waters also pick up a considerable amount of organic matter produced by decaying vegetation on the high slopes.

And so in spring, fully fertilized plant life emerges abundantly all along the Mackenzie valley. It fol-

in southern reaches of Mackenzie basin. Unlike its brother the wolf, the fox is a solitary hunter.



Arctic ground squirrel, emerging from seven-month hibernation, observes the action from its hole.

lows an astonishingly precise timetable. Everything has to happen within a compressed growing season measured in weeks. Moreover, the flowering and breeding of almost everything—plants and insects, birds and animals—is highly interdependent, so it becomes something of a cliffhanger each season.

Toward the end of the ice breakup, great flocks of migrating birds appear, many different species from all four flyways, having traveled from as far south as Mexico, South America and in one case, even from the Antarctic. They soar in on the warm air rising off the river, heading for their nesting grounds on the edge of the Beaufort Sea and the northern islands. The delta wetlands make ideal waterfowl habitat, with verdant waves of grasses and sedges for feeding the young. Because of the abbreviated summer, some species pair on the way up, build nests and hatch their young shortly after arrival.

Meanwhile, a few inches of permafrost have begun to thaw. For plant species adapted to this marginal wilderness, it is enough—and the tundra comes alive. Forget-me-nots, lupines and poppies spatter the bogs and meadows and wet shores with color. Then comes the brief efflorescence of marsh fleabane and white heather, fireweed, bearberry, cotton grass and several dwarf orchids. They flower in three to four weeks; many reproduce asexually rather than depend on pollination and scattering of seeds in the brief time allowed them.

Because the tundra is a harsh ecosystem, not many species of plants and animals have adapted to it thus far. What tundra life exists is abundant and has colonized widely. Spring on the tundra excites a rush of activity. Enormous swarms of voracious biting and sucking insects, notably mosquitoes, black flies and biting midges, emerge from countless pools and backwaters. They appear just in time to be eaten by nesting birds, and their larvae also form a dietary staple for newly hatched fingerlings.

The tundra even supports a population of small mammals—lemmings, ground squirrels and Arctic hares. Seeking them out are their natural predators: the Arctic fox and wolf, the snowy owl, hawks and falcons. The food chain also has a place for the temperamental barren-ground grizzly, the wolverine and, conspicuously, the herds of caribou so characteristic of the area. In winter the herd is safely ensconced in forests to the south. But as spring approaches it begins an annual migration, sheltered for much of the way by trees beside the riverbanks. Ultimately, the caribou appear in the open, browsing on lichens and other dwarf vegetation as they move toward their calving grounds on the Beaufort Sea. Then, as summer wanes, they turn south again. Throughout this pilgrimage the caribou are mercilessly harassed. Wolves devour the weak, the sick, the old, the young. Warble flies lay eggs in their skin. Black flies also attack. Occasionally insects become so intolerable that the entire herd can be seen shaking and twitching and changing direction to escape. All this misery is for the good of the species, of course, or else it might overbreed, overbrowse and starve.

Global forces at work

Spring on the Mackenzie gives life to still another ecosystem as the nine-foot-thick sea ice begins to melt along the coastline. Frozen to the bottom of the ice, some inside tiny cysts, microscopic plants known as phytoplankton—diatoms, flagellates and blue-green algae—have been dormant through the long winter. So have tiny animals like nematodes, copepods and turbellarians. But now, as the thinning ice transmits increasing sunlight from above, the algae come to life and reproduce by cellular fission. A vast algal "bloom" sweeps across the whole underside of the ice sheet. About two weeks later the herbivorous microfauna awake in turn and move in to feed on this timely, upside-down aquatic garden. They are followed by all sorts of creatures, especially amphipods, small relatives of the shrimp.

Then, in the Beaufort Sea and beyond, larger species of fish and crustaceans feed on the smaller forms of plant and animal life. As on the tundra and delta, the food chain tops out in large carnivores: seals, walruses and polar bears. Among the major beneficiaries are the fish-eating beluga whales and the 40-to-50-foot bowheads, baleen whales whose principal food consists of copepods and other small marine organisms. On a varying schedule determined by ice conditions, they move into the widening offshore channels and head for the clear, shallow waters of Arctic islands to the east in search of good feeding grounds. As summer approaches, they move south toward the Mackenzie delta for calving.

What the Mackenzie contributes to the life of the biosphere—and hence to the survival and prosperity of mankind—all rivers contribute. It is easy to conceive of ways to harness the Mackenzie for hydroelectric power; indeed, such projects have been discussed for years. Once in place, they would profoundly—perhaps fatally—alter another planetary life-

Herd of caribou migrates south via the Mackenzie valley toward its usual winter feeding grounds.

Calving done, animals retrace historic pathways, now often disrupted by the artifacts of Man.

Tundra slopes and alpine gardens are studded with cushions of earth-clutching herb, moss campion.

support system. Would that matter? It matters if we view the Mackenzie as a basic resource in a time of increasing environmental threats. It matters once we understand that nature is an endless, interlocking series of feedback loops, cycles which regulate themselves just as the organs and systems of the human body do, but on an incomparably grander scale.

Man is not independent of these ancient arrangements; his technology has not liberated him from the constraints imposed by the finite resources of this planet. Quite the contrary. Because of his huge populations and complex urban industrial society, he is highly vulnerable to changes in patterns of rainfall and to declining reserves of clean air, potable water, fertile soil and cheap fuels. He knows how to exploit nature, but he has temporarily forgotten how to work closely with her as his forebears did. His hubris is showing.

It is hard to imagine that Man could make much of an impact on natural systems of great magnitude and complexity. Yet a dam that obstructs the flow of mineral-laden waters, a pipeline that impedes the venerable traffic of the animal herds, a scheme to cut down huge tracts of primeval forest, a cluster of mines and oil wells, a widely disseminated chemical that interferes with reproduction of wildlife, overfishing, overgrazing—even too much backpacking—can destabilize an environment for generations to come, maybe forever, with incalculable results.

How much of the natural world can we afford to lose? No one knows. What we do know is that living things are connected, and that they have evolved together through the ages. Thus the Mackenzie can be said to engage and sustain the Amazon and other rivers as it in turn is sustained—intricately, indirectly, but most assuredly—for it is part of a global system of life.

Algae and fungi appear symbiotically as lichens, the archetypal Arctic flora and favorite of caribou.

Drier tundra zones support low-growing herbaceous raspberry known as cloudberry or dwarf mulberry.

Marshes, bogs and wet meadows are essential habitat for cotton grass, a sedge of the genus *Eriophorum* which, almost overnight, produces a flower cluster and then, like other boreal plants, soon withers.

Next month: the immortal Amazon

Courtauld Institute Galleries, London

By Kenneth Clark

Animals and men: love, admiration and outright war

Western art clearly and accurately mirrors the long history of our ever-changing attitudes toward our nonverbal kinsmen

The idea that men and animals should live together in harmony lies deep in the human imagination. This dream of a Golden Age recurs in every period of history. There is a leaf from an ivory diptych of the fourth century showing Adam naming the animals; he sits a little apart from them, and is conscious of being a trifle superior, but the animals seem perfectly at their ease and pleased with their names. Then he is joined by Eve; the animals are still there (opposite). There is no sign of fear or hostility. This vision of the Garden of Eden goes back to a far earlier concept that expressed itself in early Greek times by the legend of Orpheus taming wild animals with his song (p. 54), a myth that occurs in Aeschylus and in the *Bacchae* of Euripides.

Mozart put it into the last and most personal of his works, *The Magic Flute,* in the scene where Tamino plays on his flute and sings so that the animals gather round him (a scene, incidentally, which has nothing to do with the main theme of the opera, and was introduced simply because Mozart loved it).

Did the harmony of the Golden Age ever exist? I am afraid it is unlikely. The reason lies in that faculty which was once considered Man's highest attainment, the gradual realization that the sounds he uttered could be so articulated as to describe experiences. He discovered words. Perhaps that, rather than sexual intercourse—which after all is something he had in common with animals—is symbolized by the apple he took from Eve. He could communicate with his fellow men, and so when it came to satisfying his hunger, he could outwit the inarticulate animals: he could tell his fellow men how to dig pits and sharpen swords. The war had begun.

We must remember that primitive Man was far closer to the animals than we can imagine. Indeed, he felt—with good reason—that the animals were his superiors. This seems to be the message of the early cave paintings at Lascaux and Altamira. These are popularly known through reconstructions by anthropologists that give an entirely false impression of them. In fact, they are little more than blots and scratches, among which we may recognize undeniable likenesses of bison and other animals. These paintings, say prehistorians, were intended to give men power over animals, and thus increase their success in hunting. But can this be true of the lively and energetic animals that still can be dimly discerned on the uneven walls of Altamira? The few men who appear on the walls at Lascaux cut very poor figures compared with the vigorous animals. Can we seriously believe that these wretched little creatures thought they were gaining power over their magnificent companions? Animals were in the ascendant, and distinguished from Man less by their intellectual limitations than by their greater strength and speed. Personally, I believe that the animals in the cave paintings are records of admiration.

The animal as a symbol of the group

The next stage in Man's relationship with animals, taking place thousands of years later, seems to confirm my belief. This is the choice of an animal as the sacred symbol of a group: what is loosely called a totem. Hunting for their necessary food and admiring to the point of worship a life-endowment greater than their own, men thus established from the earliest times a dual relationship that has persisted to the present day: love and worship, enmity and fear.

Totemism has existed, perhaps spontaneously, all over the world. But it is in Egypt that we first see totemism turning into what we may call religion. So strong were the vestiges of totemism that in their art the Egyptians continually attempted to integrate man and animal. Men, whose bodies are models of human perfection, retain the heads of birds and animals throughout Egyptian history. These animal heads are an obstacle to our admiration of Egyptian art; the reverse process of the Greeks, which produced the

Before the apple, harmony prevailed in Eden: *Adam and Eve* by Lucas Cranach the Elder (1526).

Centaur and the Harpy, seems both biologically and esthetically a more acceptable form of integration. But at a very early date the Egyptians evolved the idea of the sacred animal, the equal and protector of the God King, and sacred animals are the subject of the first pieces of sculpture that can, in the highest sense of the word, be described as works of art.

We may easily feel that there are too many sacred animals in Egyptian art. Yet all of them produced images of great sculptural beauty which gain some of their power from the sacrosanct uniformity of the original idea. Small variations, which may have passed unnoticed by the believer, were due to the fact that these images were made by artists—the Egyptian artist was far from being the self-effacing craftsman of other early civilizations—who knew how to give the prototype the life-giving force of variety.

But, beyond their godlike attributes, the quantity of semisacred animals in ancient Egypt owes something to a state of mind that by no means always accompanies religious feeling: love. The Egyptians loved animals. We can see this in the reliefs that decorate tombs around Sakkara. These reliefs show that the Egyptians tried to domesticate animals of all sorts, but succeeded only with those that are our companions today, dogs and cats, and those which still occupy our farmyards. What strange operations of nature have, for 10,000 years, allowed Man to domesticate sheep, cattle and horses, but not roe deer?

This article was adapted by Lord Clark from his forthcoming book, Animals and Men, *to be published in support of the aims and activities of the World Wildlife Fund by Thames & Hudson (London) on September 12 and by William Morrow and Co. (New York) on October 12. The Fund is planning worldwide exhibits on this theme, starting this fall.*

Museo Nazionale Archeologico, Palermo

Another version of the Golden Age, Orpheus charming the animals (third-century Roman mosaic pavement).

Cats were pets a thousand years before they were considered sacred (the cult of the sacred cat comes quite late in Egyptian history), and the story in Herodotus that when a house is on fire the first thought of an Egyptian household is to save the cats —"they pass them from one to another, while the house burns down"—is as much a reflection of love as of totemism. The reliefs of animal life in Old Kingdom tombs are inexhaustibly informative and touching. One of the most familiar shows a farmer carrying a calf on his back with the mother cow following and licking it. Where in the Greco-Roman or the Semitic world could such an incident have been sympathetically observed and recorded?

In that other early civilization, which for convenience we may call Mesopotamian, such sentiments could not exist. Ur, Babylon and the other cities accumulated wealth, traded and fought with one another, but insofar as animals entered the Mesopotamian mind, they were symbols of strength and ferocity. The sense of kinship with animals has been

superseded by an overawed recognition of their strength, which can be used to symbolize the terrible power of the king.

There is no need to explain why lions and bulls were the semisacred animals of the Middle East. Their strength and potency made them the obvious symbols for a succession of warlike kingdoms. But it is worth recording two or three curious episodes in the history of the bull as a symbol of power. The first is the introduction of the bull as a spectacle in Knossos, in about the year 1500 B.C. Of this, of course, we have no information except what is provided by scanty, and often suspect, visual images. But there is no doubt that a bull was let loose in an arena, where athletes, both male and female, teased it with extraordinary agility. Historians try to interpret this as some kind of religious ceremony, but the Cretans of the second millennium seem to have been less religious-minded than their contemporaries on the mainland, and, in spite of the legend of the Minotaur, I incline to think that it was simply a form of entertainment. If this be so, the bullring at Knossos was something unique in the ancient world, and the forerunner of the Roman amphitheater and the Spanish *plaza de toros,* with the difference that we have no representation of the bull being killed or one of the athletes being gored, although it is almost unthinkable that all of them survived.

The humanizing spirit of Greece treated bulls very differently. It was their potency rather than their ferocity that impressed the Greeks; thus the bull became a favorite embodiment of Zeus, eloping with the not-unwilling Europa, as we see them on a Greek vase (p. 56).

Louvre, Paris

Egyptian art is filled with haughty and elegant cats. This bronze was cast c. 664-525 B.C.

Propitiating the gods with sacrifice

During the 3,000 years in which animals were both sacred and beloved, they were victims of a kind of formalized destruction which now seems to us almost incredible: animal sacrifice. How had this nearly universal practice grown up? Not at first from any urge to kill and destroy. The initial impulses seem to have been more specifically religious: propitiation, atonement and a consciousness of kinship. While men still felt a kinship with animals, to eat them was a crime against the group, and expiation could be achieved only by a ritual feast in which all were involved. Communion was the first basis of sacrifice, as it has remained the last. But quite soon the belief grew up that the gods were pleased by sacrifice. The more the gods had to be propitiated to avert disaster or to secure the success of some enterprise, the more sacrifices they required. The scale of these sacrifices was appalling. When, in the *Odyssey,* Telemachus came to Pylos, he found people on the shore sacrificing jet-black bulls to Poseidon. There were nine companies present and each company had nine bulls to offer. *Les dieux ont soif.*

Thus what had at first been an act of atonement, and even an assertion of kinship, becomes an act of pure destruction, in which animals feed the supposed appetites of a greedy god. And yet when we look at the sacrificial cow from the Parthenon frieze, the "heifer lowing at the skies" of Keats' ode, we are conscious of a certain solemnity. It was only much later, in the desperate effort of the Roman emperor Julian the Apostate to restore paganism, that the Parthenon is said to have stunk like a slaughter house. That a philosophically minded man should have superintended such holocausts shows how much he dreaded the triumph of Christianity.

For it was, of course, Christianity that put an end to animal sacrifice. It also adopted a symbolic animal at the opposite pole from those preceding religions. After the lions and bulls of Mesopotamia and the

Museo Nazionale, Tarquinia, Italy

Europa is about to be carried off by Zeus disguised as a bull, as shown on a Greek vase c. 490 B.C.

later cult of Mithras came the lamb and the sheep. Although the lamb is alluded to as a symbol of Christian humility in early texts, it does not appear in art till it can safely be substituted for the hermetic fish. Sheep are the chief symbolic animals of the evolved Christianity of the late fifth century A.D., and inhabit the mosaics of Ravenna, beginning with the beautiful representation of the Good Shepherd in the so-called Mausoleum of Galla Placidia (opposite).

But ancient symbolic images are not easily suppressed. The bull, the lion and the eagle make their way back into Christian iconography by a curiously roundabout route. The first vision of the prophet Ezekiel describes an image in terms which are almost incomprehensible, both visually and philologically, but which mention four faces, those of a lion, an ox, an eagle and a man. About 600 years later the author of the Apocalypse, who was so frequently indebted to Ezekiel, speaks of the four beasts that are before the throne of God: "The first beast was like a lion, and the second beast like a calf, and the third beast had a face as a man, and the fourth beast was like a flying eagle." So here they are, our ancient symbolic animals, in a Christian book believed to have been written by one of the Evangelists, a book that had an overwhelming influence in the early Middle Ages: and what could be done with them? The question, like so many in early Christian doctrines, was answered by St. Jerome. In his famous commentary on Ezekiel he lays it down that these animals are the proper symbols of the four Evangelists—the eagle for St. John, the lion for St. Mark, the bull for St. Luke and the man for St. Matthew. And for more than 700 years almost the only animals in Western art were representations of the Evangelists.

We would like animals to accept our code of moral values (in fact they have moral values of their own), and we love to imagine that they can talk. Children make their teddy bears talk to them, as no doubt did the Egyptian child with its toy hippo and the Greek child with its little bird. These atavistic impulses took grown-up form in a series of writings of which the best known are the bestiaries of the Middle Ages and the fables of Aesop. The bestiaries claimed to give information, and some of it does in fact go back to Pliny. But the greater part is based on legend and folklore. As for Aesop, the fables associated with his name exhibit the same moralizing element as the bestiaries which came much later. The concept that Man can learn from the wisdom of animals has a widespread, almost humorous appeal, and revives in a new form the sense of kinship.

Even when the age of symbolic art was over, a few pictures of animals achieve a powerful symbolic quality. One, painted at the high noon of naturalism, is Landseer's majestic stag, *Monarch of the Glen*. Nothing in Victorian literature expresses so completely the commanding self-satisfaction of the period. This was no doubt the sentiment of a vast majority. But a small minority, the pre-Raphaelites, took the opposite view, and one of their number, Holman Hunt, expressed it in what is one of the few religious pictures of the age, *The Scapegoat* (pp. 58-59). It was painted with incredible difficulty on the shores of the Dead Sea. Holman Hunt described in detail how he wished to make his goat a symbol of sacrifice, using both the Bible and the Talmud as his sources of inspiration. When it was exhibted, a few critics were disturbed by the expression of Christlike resignation on the goat's face. The majority thought it was just a silly old goat, and could not imagine why Mr. Hunt had gone all that way to paint it.

From symbolism to scientific observation

Long before men had ceased to think symbolically they had begun to think scientifically; that is to say, they had begun to measure and to observe. The first attempt to represent an unusual animal is Matthew Paris' ungainly drawing of an elephant, given by Louis IX to Henry III. But in the mid-13th century a painter was not capable of recording his observations very accurately, and it was only in the late 14th century that one finds real precision.

Mausoleum of Galla Placidia, Ravenna

In Christian symbolism, the lamb represents not only Christ as the sacrificial victim, but also the soul of the innocent tended by the Good Shepherd —as depicted in this mosaic lunette in Ravenna.

At the end of the 15th century there appears one of the most skillful portrayers of animals in the whole history of art, Albrecht Dürer. His hand and eye were like the servants of an insatiable curiosity. From his early period comes a monumental crab, a meticulous beetle; then a rhinoceros in full armor; from his last years a walrus with spiny snout (p. 59), which he saw when he went in search of a gigantic whale that had been washed up in Zeeland, but unfortunately had disintegrated by the time he got there.

As observations, Dürer's drawings of animals have never been equalled. But did he feel anything of the unity of men and animals that is my theme? I doubt it. There was no room for such a sentiment in the Man-directed world of the high Renaissance. Indeed, the only artists who saw men and animals bound together by common purposes were those relatively obscure (I believe much underrated) painters, the Bassano family. Jacopo Bassano painted a vast and very detailed picture of one of the great early myths of unity, the entry of the animals into the ark (pp. 60-61). What a labor of love! Subject and treatment leave one in no doubt that Bassano felt the interdependence of animals and men in a way unknown to any other painters of the Renaissance.

Who can draw the line between animals observed and animals beloved? I suppose that George Stubbs could not have painted horses with so much feeling for their characters if he had not loved them. But he was a classic artist, who did not often show his feelings, and almost the only time he did so is in his picture of a horse called Hambletonian (pp. 58-59). Hambletonian had been forced to race a famous horse, much his superior, and won the race by a neck, having been cruelly punished by his jockey. It broke his spirit, and he never raced again. All this Stubbs has conveyed with a moving restraint.

The love of animals is sometimes spoken of by intellectuals as an example of modern sentimentality. They have evidently forgotten two passages in Homer which I would have thought unforgettable. The first, in the *Iliad*, describes the horses of Achilles when they learned that their charioteer "had been brought down to the dust by the murderous Hector." Automadon coaxed them and lashed them freely, but the pair refused to move. "Firm as a gravestone planted on the barrow of a dead man or woman they stood motionless, with their eyes to the ground, as they mourned their lost driver." The other is the moment in the *Odyssey* when Odysseus, disguised from Penelope and her suitors, is recognized by his old dog: "There, full of vermin, lay Argus the hound. But directly he became aware of Odysseus' presence, he wagged his tail and dropped his ears, though he lacked the strength now to come any nearer to his master. Yet Odysseus saw him out of the corner of his eye, and brushed away a tear."

But, as you have observed, these passages are about

The Trustees of the Lady Lever Art Gallery, Port Sunlight

National Gallery, London

Richard II's emblem, a white hart (often seen on inn signs), adorns back cover of a diptych (c. 1395).

Holman Hunt intended *The Scapegoat* (1854) to be a religious symbol, went to Dead Sea to paint it.

horses and dogs, and there is no doubt that it was through horses, dogs and cats, what we call "domestic animals," that for centuries Man maintained his communication with the animals. For some mysterious reason, cats are very rare in European art (in Chinese art they are a favorite subject). But horses inspired Stubbs, to my mind one of the greatest English painters, and the marvelously gifted Géricault, who loved the untamed energy of horses. The procession of dogs in European art is endless, but compared to the dogs of Titian and Velázquez, the dogs in English painting are lightweights. Gainsborough loved a white terrier that belonged to his friend Abel, inflicted it on his sitters, and even painted a portrait of it and its mate. Hogarth loved his dog Trump, which was his constant companion and looks as though it knew a good deal about its master's life.

It is sometimes said that the love of dogs is more intense in England than anywhere else. There are countries where, for no clear reason, dogs are despised.

National Trust (estate of the Dowager Marchioness of Londonderry)

George Stubbs' *Hambletonian, Being Rubbed Down* is full of the strength and energy of a great horse.

British Museum, London

Albrecht Dürer's *Walrus* (1521) is a late drawing by one of the greatest portrayers of animals.

In India and most Moslem countries they lead a dog's life. And even in some Catholic countries they come in for harsh treatment from simple people who have been told that they are without souls. As the Neapolitan says when reproved for beating his donkey: *"Perchè no? Non è cristiano."* I have also known some Englishmen who rebel against the Anglo-Saxon obsession with dogs. They would be shocked by that remarkably intelligent and unsentimental woman, Edith Wharton. Asked to draw up a list of the seven "ruling passions" in her life, she put "Dogs" second, after "Justice and Order." "Books" came third. But in a diary entry she wrote a beautiful modification of her feelings: "I am secretly afraid of animals—of all animals except dogs, and even of some dogs. I think it is because of the us-ness in their eyes, with the underlying not-us-ness which belies it, and is so tragic a reminder of the lost age when we human beings branched off and left them: left them to eternal inarticulateness and slavery. 'Why?' their eyes seem to ask us."

We love animals, we watch them with delight, we study their behavior with an increasing curiosity; and we destroy them. Men have always hunted them with a ritualistic, almost a religious, fervor, which reminds us of our first relationship with them. Animals eat each other, and we eat animals.

But when we pass from the destruction of animals for food to their destruction as a source of money-making, we may be permitted a different stance. In the 17th and 18th centuries the fur trade began to take toll of a wide variety of animals; and in the 19th

century took place the most colossal slaughter of all, the attack on the American bison. It is said that 60 million buffalo were reduced to 3,000. Buffalo Bill became a folk hero. As mechanical skills increased, the harpooning of whales became equally menacing to the survival of these intelligent and, for the most part, harmless animals.

In the Middle Ages the relations of men and animals, which had been a haphazard mixture of love, exploitation and destruction, produced a kind of natural balance such as existed in the animal world itself. In the 19th century it became an all-out war. At the same time, those who did not profit directly from killing animals became more sentimentally attached to them, and the knowledge of animal behavior increased to a point undreamed of by earlier naturalists. People became aware that whole species of animals were in danger of being wiped out. The idea of animal conservation appeared just in time; but it will need more than knowledge and devotion if it is to succeed. What is needed is not simply animal sanctuaries and extensive zoos, but a total change in our attitude. We must recognize that the faculty of speech, which has given us power over those fellow creatures whom we once recognized as brothers, must carry with it a proper measure of responsibility. We can never recapture the Golden Age, but we can regain that feeling of the unity of creation. This is a faith we all may share.

Jacopo Bassano's *The Animals Going into the Ark* (16th century) is a celebration of the fact that men and animals share the same world and the same fate.

By gracious permission of H.M. Queen Elizabeth The Queen Mother

By Margery Elfin

Vice Presidential home on Naval Observatory hill

Mondale's official residence is reminder of another age, but is graced with his wife's choice of modern paintings

Two weeks before his inauguration, somebody joked at a birthday party for Walter F. (Fritz) Mondale that at 49 and after a prestigious career in the Senate, he was about to move into public housing.

Still, the Vice President's residence, a splendid white building which dominates the Naval Observatory hill in Northwest Washington, hardly fits the conventional idea of public housing. In fact, most Washingtonians would consider it a location superior to that of the White House—farther from the downtown crowding and generally better situated because of its elevation and parklike grounds.

Originally designed as a residence for the superintendent of the Naval Observatory, the site was chosen expressly for its distance from the unhealthy Washington lowlands where the White House is located. A commission named by President Rutherford B. Hayes decided to acquire Mrs. M. C. Barber's 72-acre Georgetown Heights estate in 1881, especially because it conformed with the mandate from Hayes to find a place "free from obstructions on the horizon and from objectionable vibrations of traffic" that would interfere with astronomical observations. The traffic noises have changed from the sounds of horses' hooves to those of automobiles, but the acreage still retains its pastoral character above the roar and congestion of Massachusetts Avenue.

The architect chosen to design the Naval Observatory home was Leon E. Dessez, a Washingtonian whose style some consider to represent the best of

Washington is rarely this way. Like a sternwheeler riding the lawn, the Vice Presidential residence

forms a dramatic backdrop for a scene perhaps more typical of another age as the Mondales entertain.

Photographs by Robert C. Lautman

the late Victorian period. The residence remains a nostalgic tribute to an era when comfort and spaciousness counted more than architectural purity. The house was completed under the Presidency of Grover Cleveland and served as the residence of the superintendent from 1893 until 1928, when it became the official home of the Chief of Naval Operations. The Naval Observatory itself, a laboratory and observation station, is the center of the 72-acre site.

It wasn't until 1974 that Congress designated the Superintendent's house as the Vice Presidential residence. The Fords never had a chance to move into the Massachusetts Avenue home, although Betty Ford had chosen most of the household accessories, such as china and crystal, in preparation. Watergate events catapulted Ford into the Presidency before the house was ready for them. Nelson Rockefeller chose not to move in (evidently preferring his own even more spacious home on Foxhall Road), although he opened the house to Congress for several receptions and furnished it according to his own taste. Thus, the Mondales are the first family to occupy it as a Vice Presidential residence.

Driving up the hill the short distance to the big house, one sees on the right some drab-looking Navy buildings and an old carriage house. The Secret Service occupies space in one of these small structures. The Vice Presidential area is made up of 12 of the 72 acres, and on a corner of its terrain, a stone's throw away from the British Embassy, the Mondales have planted a vegetable garden, tended mainly by a live-in college student. The Vice President shares the use of two tennis courts and the enjoyment of the wooded grounds with the resident Navy families.

Margery Elfin, free-lance writer, of Washington, teaches political science at Hood College, Maryland.

It could be the den of any comfortable American home except for the examples of art everywhere.

It is difficult to ascertain a definite architectural design from the exterior. The house is a conglomeration of disparate details. The brick and frame construction is painted white; there is a steep slate roof with three dormers which reduce the space on the third floor considerably but admit light to the bedrooms. On the southeast corner of the house rises a Romanesque turret which adds a touch of the picturesque and provides the Mondales and their 17-year-old daughter, Eleanor, whose room is directly overhead, with marvelous tower suites.

The house represents a romantic symbol of old American values—more comfort than style. One can conjure up images of front-porch politics, gentlemen in straw hats, summer socials on the vast lawns—perhaps a game of croquet in summer, a sleigh ride down the hill in winter.

The feelings engendered by the exterior of the house and its late 19th-century charm make a step over the threshold a startling one. Once inside, to the left in the vestibule, is a Robert Rauschenberg poster, *Signs,* a collage of symbols of the turmoil of the 1960s. That provides the introduction to a large

Joan Mondale: a sound grounding in contemporary arts and crafts, a desire to spread the good work.

collection of contemporary American art, by means of which Joan Mondale has enlivened the institutional decor of a house provided by the Navy. Her idea is to feature art from museums in different parts of the country, a year at a time.

It is a stunning and surprising collection in such a setting. The works displayed now come from Midwestern museums and include, besides Rauschenberg, Roy Lichtensteins, a Jasper Johns and an Andy Warhol, as well as pieces by lesser-known artists and craftsmen from the Mondales' home state of Minnesota. There are sculptures, tapestries, watercolors, lithographs, paintings and a fine selection of pottery, Mrs. Mondale's first artistic love.

Everyone asks whether the Mondales sleep in the Max Ernst bed installed by Nelson Rockefeller, but that surrealistic piece of furniture, which was the highlight of the Congressional tours through the house, was Rockefeller's personal property and did not remain. Rockefeller did leave a mahogany dining-room table where he had eaten as a child, as well as some graceful Chinese Chippendale chairs and chests. Asked whether the new environment had changed the family life-style, Joan Mondale replied that eating at the Rockefeller table has had a beneficial effect on the children's table manners.

Although the house is not particularly luxurious, it was designed for a family with servants. The kitchen is at basement level and the food is brought up on dumbwaiters. The downstairs kitchen is equipped with a microwave oven, a large range and refrigerator to enable the staff to handle dinner parties of up to 40 people and cocktail parties considerably larger. To make life a bit more normal for the Mondales, there is a small pantrylike kitchen off the dining room where they can make sandwiches or simple snacks without bothering the staff of six Navy men. Like most kids, however, the Mondale children tend to gravitate toward the kitchen when they're hungry. "There's more food down here," said Eleanor, caught with a cheese snack downstairs.

The large reception hall, which would be considered waste space in more modern houses, serves as a calm introduction to the house. It is often graced by the Mondales' blind collie, Bonnie, which spends some days sleeping in the center of the hall rug. The

staircase to the first bedroom floor forms a pleasing curve up from the hall, and the painting on the stair wall is Edward Hopper's *Sunday*.

Off the center hall to the left is a small alcove where the Kleelike work of a Minnesota artist, Steven Sorman, captures the waiting visitor's eye. The dining room is an impressive size, for the Rockefeller table seats 16. There is a beautiful old Oriental chest, and on the walls are the abstract works of William Baziotes *(Opalescent)* and Ellsworth Kelly *(Red, Black, Blue)*. The Vice President tends to regard the art with bemused tolerance, particularly some of the Pop Art such as Claes Oldenburg's *Alphabet/Good Humor* prototype, which bears an uncomfortable resemblance to human intestines. The children are not so tolerant, but have satisfied their own tastes in their room decoration. Eleanor's class at Georgetown Day School has presented her with a canvas mural of abstract design. Teddy, the elder son, is a motorcycle nut, while William, the younger, is a lacrosse player. The two male siblings have very small bedrooms, in contrast to Eleanor's tower room.

Downstairs to the right of the entrance hall is a small sitting room back-to-back with a den. Each room has a fireplace and some interesting pottery objects, along with the paintings and sculpture. Perhaps the most attractive room is the smallest—a garden room, lopped off the end of the veranda and enclosed. It is full of plants and wicker furniture.

In her initial selection of art for the house, Joan Mondale was aided by her old friend, Martin Friedman, director of the Walker Art Center in Minneapolis. Joshua Taylor, director of the Smithsonian's National Collection of Fine Arts in Washington, and his staff also helped with the hanging, no small task.

Next year art from the Southwest will be on view. There is a strong appeal to regional pride and a desire to extend the breadth of museum appreciation beyond the East Coast.

The curvilinear porch of the house is gracefully embellished with decorative rail and Greek columns.

When, in the summer of 1972, Joan Mondale was writing her book *Politics in Art* and spending a lot of time in the library at American University, she would not have believed that the Rauschenberg which is on the book's cover would be in her own home. Joan says, "It's a daily lift to get up in the morning and know you'll come downstairs to find yourself surrounded by art."

A history major at Macalester College in St. Paul, she minored in art and French and spent a semester in France studying contemporary church architecture. After graduation she worked in Boston at the Museum of Fine Arts and then moved back to Minnesota, where she worked at the Minneapolis Institute of Arts until her marriage. When Fritz was elected to the Senate, she began doing volunteer work as a docent at the National Gallery of Art, and eventually wrote her book. From her book she developed a slide talk to give to women's groups on a theme that fascinates her—the connections between art and politics. The book, geared to the junior high school level, is a clear exposition of human issues as portrayed in various art forms.

Surrounded by green lawns and leafy curtain of trees, Fritz and Joan Mondale enjoy a quiet moment.

The idea of a public figure choosing a cause and publicizing it is a special aspect of American politics. The task seems to fall most often to the wives of our top executives, at least in recent years, when Jacqueline Kennedy brought culture to the White House and Lady Bird Johnson decided to beautify America. When Mrs. Nixon came to the White House, there was quite a bit of head scratching about just what *her* cause should be. Precedents seem to be established so quickly that what had been a pleasant avocation and "press or picture opportunity" for Mrs. Kennedy became a necessity for Mrs. Nixon. Rosalynn Carter has chosen mental health. In a particularly energetic administration, the Vice President's wife could not sit home and enjoy the view.

In Joan Mondale's case, no one had to create something for her to do. From the time she was growing up in Pennsylvania, she had always been interested in art. Her father was a minister who served college campuses, so that she was reared in an academic and cultural milieu. Her uncle, Philip Adams, was director of the Cincinnati Art Museum. Joan began visiting museums at a very early age: "I remember being taken as a child to the University of Pennsylvania Museum to view Biblical artifacts. I also took classes in jewelry making and can't remember a time at home when my mother and sisters weren't busy with some handiwork project."

When Jimmy Carter chose Walter Mondale as a running mate, Joan was very pleased at the opportunity to spotlight the arts as part of her role. "I see myself as a listening post—keeping in touch with people in the arts and finding where help is needed, and in this way being advocate for the arts in government," she says. A quiet but forceful speaker, she is much in demand by all kinds of culturally oriented groups. Despite innumerable trips to museum openings, crafts fairs and meetings on the arts, Joan has not become blasé, but seems to retain a genuine enthusiasm for meeting artists and community leaders.

Some of her encounters have affected her deeply. Meeting Georgia O'Keeffe in her home outside Santa Fe for private conversation was a highlight, as was the chance to watch Maria Martinez, a 96-year-old legendary potter (whose work is displayed in the residence) shape a pot.

She feels gratified that she can enjoy these heady experiences while serving the artistic interests of the nation. After 12 years as a Senate wife and volunteer in the arts, she has found a niche which suits her and where she feels she can be effective. It's a far cry from the Washington story she tells about a friend of hers who was trying to interest her dinner partner in a discussion of *Art News,* only to discover that the gentleman wanted to know, "Art *who?*"

How will Joan Mondale be different from any other political wife espousing a cause? Most important is the fact that she knows something about the cause she has chosen. That knowledge of the art world can make the difference between an empty public relations campaign and a record of achievement in moving the arts forward in this country.

A knowledgeable voice for the arts

There could be something offensive about an amateur speaking for the arts, and Joan Mondale will certainly try not to fall into the trap of a Lady-Bountiful, Patroness-of-the-Arts caricature. She feels that by talking and listening to as many people as she possibly can, she can learn something about the problems of the artist in this country and have an impact on solving some of those problems. She is not so naive as to think the answer is always government funding, but she does envision expanding opportunities for the individual artist in government.

"Do you realize how many opportunities there are for artists?" she asks. There's the National Endowment for the Arts, which Joan feels has done a

good job in reaching into the community and encouraging local projects. Then there's the General Services Administration, which is responsible for government building and maintenance. By law GSA was supposed to allot one percent of all building costs for art, but this was cut back during the Ford administration to three-eighths of one percent. "You see what an important role government can play in providing work for artists?" says Joan in the animated manner she has when something is very important to her. "The economic livelihood of the individual artist concerns me. I have dedicated works of art on government property—Oldenburg's baseball bat sculpture in Chicago, water sculpture and murals in federal buildings in Philadelphia—and I'm glad to see government using art."

The idea of awakening people to the fact that art exists outside the large metropolitan areas is central to Mrs. Mondale's concept of her own role. That is why she spends time on the road to see what is being produced by artists and craftsmen in all parts of the United States.

All artistic expression interests Joan Mondale, but pottery is her own special craft. She manages to fit in two "pottery mornings" a week when she is in town—one as a student of Vally Possony, a woman who has been a major inspiration to her, and another sharing a studio with friends in Washington. The handcrafted object has a strong appeal for her; whether it's a tapestry or a jug, she is delighted by the craftsman's skill.

The household staff smoothes life for the Mondales and handles the details of the daily routine. Thus, Joan has been able to have a series of luncheons and receptions to let friends, the press and Congress view the art. The house is also used for working dinners by the Vice President, so the staff is kept quite busy, which makes a change from the Rockefeller days. Then, when there were more than 15 guests, Rockefeller called in a caterer (at his own expense). The Mondales can't afford that kind of entertaining, but the staff feels challenged to meet the demands of a very full schedule.

When Fritz Mondale was a senator, they hardly ever entertained, and they have not suddenly metamorphosed into social butterflies. However, they are well aware that the house is the government's and that it serves a public purpose as well as their own. That cannot mean opening it to every group, educational or civic, that wants to come through because, unlike the White House, there are no separate formal rooms as distinct from family quarters.

Still, it's not an imperial life-style, no more grand, actually, than a college president's might be, but the budget is bigger and the presence of the Secret Service adds a serious dimension to the Vice President's family life that is alien to the unpretentious Mondale way. Joan laughs when asked how many Secret Service attendants they have; "Just say we have his and hers." The Mondale children tend to behave naturally despite their new surroundings. They simply refuse to be impressed. One evening, after a typically busy day, Joan entered the dining room a bit late to join the children and a few of their friends for dinner. She suddenly stopped and asked where their father was. She was greeted with a perfectly straight-faced response. "Mom, don't you remember? He's not eating home. He's eating with the King [of Jordan] tonight." It was perfectly true, but struck everybody as hilarious.

The house stands as a quiet showcase for American art, reflecting Joan Mondale's interest and personality. It has an enduring quality which will certainly serve other families in different ways, as it has since 1893. A few years ago, Myra MacPherson, a Washington journalist, wrote a book called *The Power Lovers* in which she characterized many political wives in an unsympathetic manner. The book exploded on the capital's cocktail circuit. The portrayal of Joan Mondale was a devastating profile of a politician's wife with no identity of her own. She was the team player whose husband's career was her life. What Joan Mondale has done with the Vice President's residence and the seriousness she has brought to her new role make it clear that she could never be a pale reflection of someone else's achievements.

Vice President and Mrs. Mondale with two of their three children, Eleanor, 17, and William, 15. Teddy, 19, skipped the meal. Bonnie, the collie, in front.

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[1] "Staggering" is probably too weak a word. The share of the gross national product which goes for health services has virtually doubled in the past 15 years. The Government's share of the national health bill is now $70 billion—a sum second only to national defense.

[2] This requires Ætna knowing what the prevailing charges are for every type of medical service in every area of the country, and examining each claim against that standard. Costs vary wildly from city to city. In Philadelphia, $413 is the average surgeon's charge for the removal of a gall bladder; in Manhattan, the same operation averages $813!

[3] Many minor operations—as many as 20% of all hospital operations—can properly be performed without the patient staying at the hospital overnight. At the now-prevailing rate of $175 a day, this could mean enormous savings. Ætna also advocates peer-group review by doctors of cases of improper hospitalization—again, to prevent misuse of hospital facilities.

[4] "Co-payment" reduces premiums; it also gives the consumer a reason to *care* about health costs, and to demand reasonable ones. Today, frankly, too many consumers of health care have too little stake in controlling costs.

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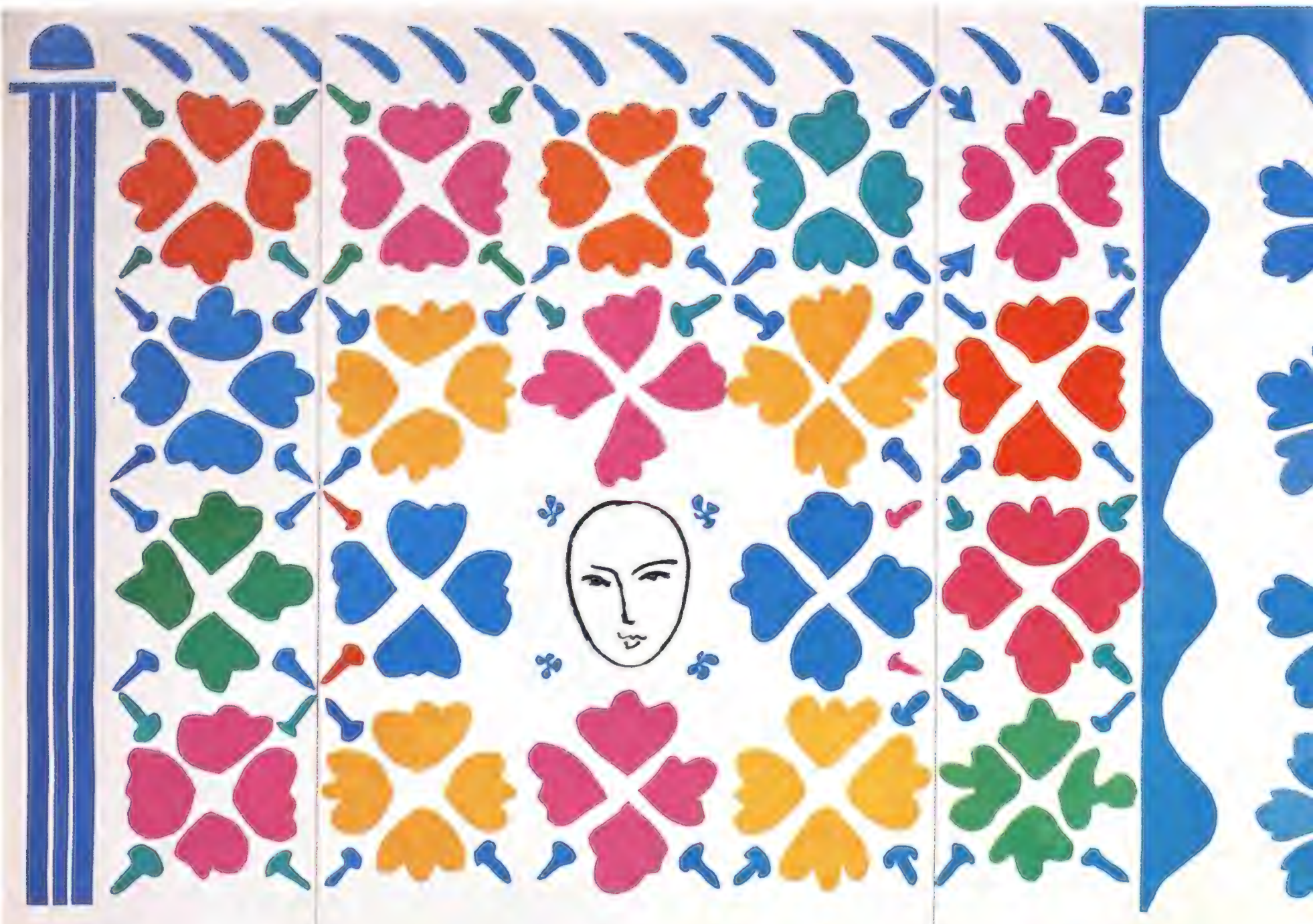


By John Russell

Final flowering of Henri Matisse, invincible artist

In his last years, infirm but undaunted, a grand master of the modern era made great art with paper and scissors

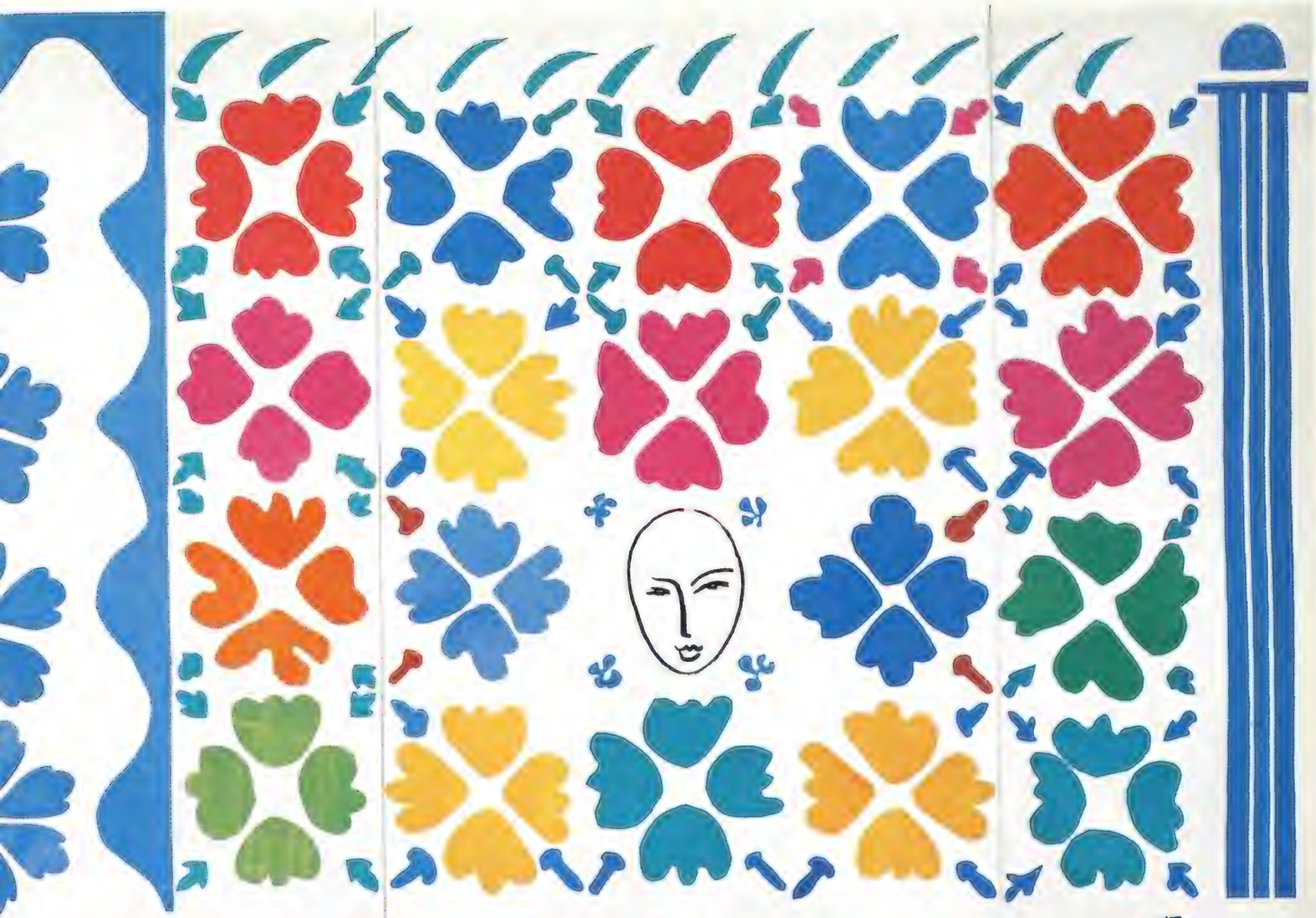
This inspired, efflorescent work, in which a lively spontaneity exists alongside order, was

No one who was around at the time will ever forget the impact of Matisse's cut-paper works of art when they were first shown in Paris in 1949. It was as if painting itself had been reborn. Matisse in arithmetical terms was an old man—his 80th birthday fell on December 31, 1949—but the cut-papers came across with an effect of youth and exhilaration which was all the more welcome at a time when there was very little else in Paris to rejoice at.

For Paris in 1949 was an exhausted and a divided city. Though virtually undamaged in World War II, it was in physical terms a glum and shabby place in which almost everything was in short supply. Five years of German occupation had left a legacy of hatred and recrimination, one which sundered Frenchman from Frenchman.

Henri Matisse was as exempt from political feeling as a man can be, and he certainly did not intend his cut-paper compositions as an alternative to the dis-

National Gallery of Art, Washington



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created by Matisse in 1953, when he was 84. He called it *Large Decoration with Masks.*

tresses of the day. But that is how they struck us, nonetheless. What they had to offer was in the highest sense a moral lesson. We felt about them as the German poet Rainer Maria Rilke had felt about a certain sculpture just 50 years earlier. "After this," he wrote, "we must live differently."

Matisse had done the right thing at the right time. He contributed to the convalescence of Europe in ways which can still be descried in the comprehensive exhibition of his cut-paper paintings which has been organized by Jack Cowart of the St. Louis Art Museum with assistance from John Hallmark Neff of the Detroit Institute of Arts. It will be seen initially at the National Gallery of Art in Washington from September 10 to October 23, 1977, and later in Detroit (November 23, 1977, to January 8, 1978) and St. Louis (January 29 to March 12, 1978).

Matisse had always intended his paintings to make people feel better. As early as 1908 he said that he dreamed of an art which "could be for every mental worker, for the businessman as well as for the man of letters, for example, a soothing, calming influence on the mind, something like a good armchair which provides relaxation from physical fatigue." And the cut-papers can beyond a doubt be enjoyed in that way: more so, indeed, than most of Matisse's oils. Our cares vanish at once in the presence of those bright incorporeal scraps of paper, whereas when Matisse puts brush to canvass a sympathetic witness will sense the magnitude of the task which he has set himself. In the oils, the whole of art history is on his back; but what we see in the cut-papers is the art that conceals art.

But if the cut-paper compositions contributed to the convalescence of Europe, it is primarily because

New York Times *art critic John Russell last wrote about Vollard in the July issue of* SMITHSONIAN.

Collections Tériade, Paris

It can be relished just for color and shape, but it's *Swimmer in the Pool.*

convalescence is what they are about. Matisse made them, that is to say, at a time when he had come back from the very edge of the grave and was in no state to make paintings in any other way. In 1941, when he was 71 years old, Matisse underwent a drastic and extensive internal operation. When it was over, and he was seen to be getting better, his nurses called him "the man who came back from the dead"; but for the rest of his life he was too weak to stand for long at a time and his powers of endurance in general were greatly diminished. Most men of his age and position would have settled for an honorable if precarious retirement. There was no reason, after all, for him to go on working. He had proved himself over and over again to be one of the great artists of all time—as an easel painter, as a muralist, as a sculptor, as a printmaker and, yet again, as a master of the illustrated book.

But he was hardly clear of the surgeon's knife when he wrote to a friend that he had derived great moral benefit from the operation. "I see clearly, now," he said. "I have my whole career in focus, and its continuity, also." "Continuity" is the key word in that remarkable sentence. Matisse had always had a genius for continuity; or, to put it another way, continuity had always been fundamental to his genius. He knew when to concentrate on easel painting, and when to give it a rest. He knew when his ideas could best be put into sculpture, and he also knew when he was ready for a large-scale decorative scheme like the one for the Barnes Foundation in Merion, Pennsylvania. He was never idle, but what is more to the point in this context is that he seems never to have gone off on the wrong track. Continuity was fundamental to everything that he did; and continuity was nothing more than an instinct—infallible—for what he needed to be doing at any given time.

Even so, it was rash for him to speak of continuity in the spring of 1941. He had read in a medical textbook that even if he got through his operation he was unlikely to live more than another year or so.

Initially it meant a refusal to give in to nature. In this, he had Auguste Renoir in mind. Matisse had

A daring summation in oil, the master's towering *Large Interior in Red,* his farewell to easel painting.

Musée National d'Art Moderne, Centre Georges Pompidou, Paris

known Renoir towards the end of World War I, when Matisse was first living in Nice and Renoir was at Cagnes, a few miles away. "During those last years of his life," Matisse said later, "Renoir was just a bundle of pain. He had to be carried about in a chair. He fell into it like a dead man. His hands were bandaged, his fingers were twisted like the roots of a tree, he could no longer hold a brush. They used to have to push the brush through the bandages so that he could somehow get a hold on it. The first movement was so painful that he winced. But after half an hour, when he got going, he rose from the dead. I have never seen a happier man. And I swore that when the time came I, too, would have the courage to go on."

Continuity to Matisse meant carrying on with ideas that had haunted him all his life, but also finding a completely new way of expressing them.

Matisse got back to his home above the city of Nice just as soon as he could. Though he was without any kind of conventional religious belief, he did undeniably feel in his last years that fate was taking a hand in his affairs. By June 1941 he was painting and drawing again; and before long he was also at work on illustrated books (one of them already planned before 1941, the others new projects). Matisse never took a commission lightly; and the illustrations for the poems of Ronsard, in particular, occupied him on and off from 1941 to 1948. What had been intended as a book with 30 lithographed illustrations turned out to be a book with 126 of them, for Matisse even in old age was a prodigious worker. He went on doubling the stakes until in 1948 he painted one of the largest and most audacious of all his easel pictures: the *Large Interior in Red* (p. 74).

This *Large Interior* can be construed as a majestic farewell to painting as Matisse had been practicing it since he was first given a box of colors in 1890. Except that it includes no human figure, it is made up of just about everything that Matisse most liked to paint: an interior saturated with a single color, two strong tables with curvilinear legs, a tall thin Dutch chair to add a vertical emphasis, as many bouquets of flowers as the tables can carry, and two animal-skin rugs. The flatness of those skins has a vital part to play in the argument of the picture. Our instinct is to fill them out, as we fill out the idea of a tiger or a leopard if someone speaks of them in life. But their unwonted flatness makes us look more closely at all the other objects which are portrayed in the painting, and not least at the two pictures which hang on the wall. Matisse always enjoyed painting a picture-within-the-picture, and in this final summation of his endeavors as a painter he put in two of them side by side: a big painting of a pineapple on a chair and a no less imposing drawing in black and white. What Matisse went after in this big drawing was an alternative interior: one which would hold its own against the brilliant color of the rest of the painting and yet stick rigorously to black and white. Just how he achieved it is a miracle of midcentury painting.

There was no question, therefore, of any falling-off in Matisse's capacities. But there was a falling-off in his physical strength, and after the *Large Interior in Red* there was one of those natural pauses which had occurred after every great climax in his career. Nothing more could be done in that particular line. The practicalities of the Vence chapel—that sublime little building, a conjoined triumph of art, architecture and spirit, that Matisse engendered in the south of France—filled much of his time for the next three years. But there was a sense in which destiny had still some choosing to do on his behalf, and it was this choosing that led to the creation of the cut-papers.

Drawing on the idea bank

Three things were in question. One was the ambition for which he found words in 1943. "Everything seems to indicate," he said to the poet Louis Aragon, "that before long I shall start work on some large-scale compositions, as if I had my whole life before me, or the whole of another life." The second motor element in the cut-paper works was the idea bank which Matisse had been building up for years. They were ideas which didn't suit for easel painting, didn't suit for sculpture, and didn't suit for drawing in pencil or ink. And then there was a third factor: the grim one. Matisse just wasn't well enough, and would never again be well enough, to make major art in any of the ways that he had made it before. Only two possibilities were open to him: retirement or a new start. He chose the new start, and the cut-

Collection of Robert Motherwell

Done in 1949, *The Dancer* evokes the essential ideas of freedom of motion and form which go with the title, but there is, also, the superb abstract design so typical of Matisse's late decorative paperworks.

paper "paintings" came as the result of that choice.

The technique in itself was not new to him. Already in 1933, when he was working on his mural for the Barnes Foundation, he realized that it would take forever to paint a full-size draft for every possibility that occurred to him. Yet at the same time he needed to think as much in terms of scale as of design. If he cut his design out of large sheets of painted paper he could adjust and revise and recombine as often as he pleased and with a minimal loss of time. He did find, however, that the cut-paper medium had a life, and almost a will, of its own. It was not content to be just a superior subterfuge. It was a medium in its own right, and quite possibly a medium of unguessed potential.

So he turned it over in his mind. He used it for a magazine cover, and he tried it out as a basis for a still-life painting, and gradually it became clear to him that it could bear the weight of ideas for which the slower, heavier, more conventional modes of expression were merely so many forms of inhibition. Cut paper set him free; in the 1940s he gave it its first big chance in the book which he called *Jazz*.

Jazz was something quite new for Matisse. It was the first of his books which was entirely his own invention. No great writer stood behind it. The texts were by Matisse himself. The images were without precedent in his work. They were built up by the cut-paper process, and they drew upon experiences which he had stored up for many years. Even the title was significant: "jazz" 30 years ago had a jaunty, off-beat, transatlantic implication which was quite contrary to the rules of the School of Paris. *Jazz*, in a word, was no less than a declaration of independence and Matisse did not make the choice lightly.

Matisse himself summed up the source material of *Jazz*. "The images in these lively and violent prints," he wrote, "come from memories of the circus, popular stories, and travel." This one sentence tells us to what an extent the cut-paper medium liberated Matisse from the inhibitions imposed upon him by high art and the French tradition.

But *Jazz* was not composed according to the principles of high art. Matisse took sheets of colored paper and he cut into them with scissors. Preliminary drawing as such had no part in the operation. He felt as if he were cutting into pure color, the way a sculptor cuts into marble. The scruples and inhibitions of high art dropped away, and he dipped into his unconscious with an unprecedented freedom.

It was on quite a small scale, however, in physical terms. There was no question, in *Jazz*, of the large-

The subject of this lyric work entitled *Women and Monkeys*, created in 1952, is incidental

scale compositions of which he had spoken in 1943 (*Jazz* came out in 1947). He could work on it in bed; for anything larger, other methods would have to be found. Luckily, he had at his disposal that most disinterested of assistants, Madame Lydia Delectorskaya. With her assistance he was soon able to work with a big pair of shears on very much larger sheets of painted paper. These were then pinned up and eventually transferred onto canvas under his direction. Many of them were very large indeed: 12 feet by 25 feet was nothing unusual, and the National Gallery of Art's *Large Decoration with Masks* (pp. 72-73) measures 139 by 393 inches. But one and all of them have it in common that they look as if they had been wished out of the air, instantaneously and without human intervention. Nothing could be further from the truth, of course, but the effect is what Matisse would have wanted.

The subject matter of these later and larger cut-papers is not as unexpected as the subject matter of *Jazz*. He had made botanical drawings which foreshadowed the adaptations of nature in the cut-papers, just as he had made sculptures which foreshadowed the poses of the heavy-limbed girls who move in and out of these new and colossal spaces. But there were monkeys and acrobats, masks and elements of architecture which have no parallel elsewhere in his work. There were abbreviations of form which remind us of how his teacher Gustave Moreau once said to him, "Matisse, you were born to simplify painting"; and there were large compositions in which for the first time in his life he came near to a decorative abstraction. Matisse was at a stage at which he was free to do whatever he liked, and in the cut-papers he found the ideal medium in which to do it.

These great works were soon shown here and there, all over the world, as occasion offered. The most important ones ranged in date between 1950 and 1954, though numerous trial runs dated from much earlier and certain tapestry designs done in 1946 were made from cut-paper cartoons.

It should be one of the merits of the upcoming exhibition that it promises us for the first time a comprehensive and informed study of exactly how well these great works are standing the test of time as physical objects.

How well they will last as physical objects is a matter for the specialists, and we must hope that the specialists will come up with the right answer, just as Matisse came up with the right answer when nature said to him "It's time you stopped painting," and he told nature what to do with her advice.

to what is, in its essence, a celebration of the singing spirit of the indomitable artist in his old age.

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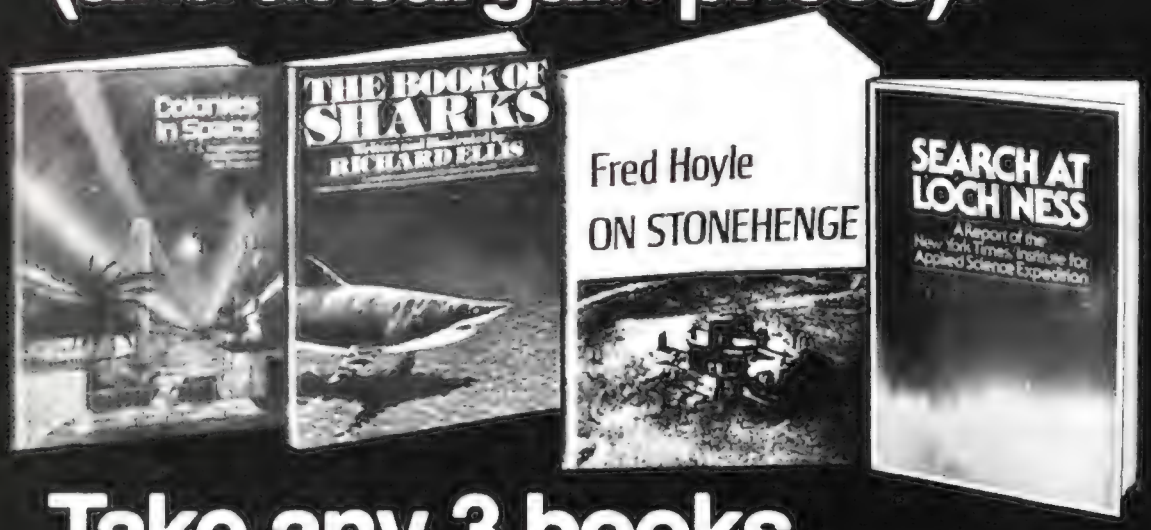
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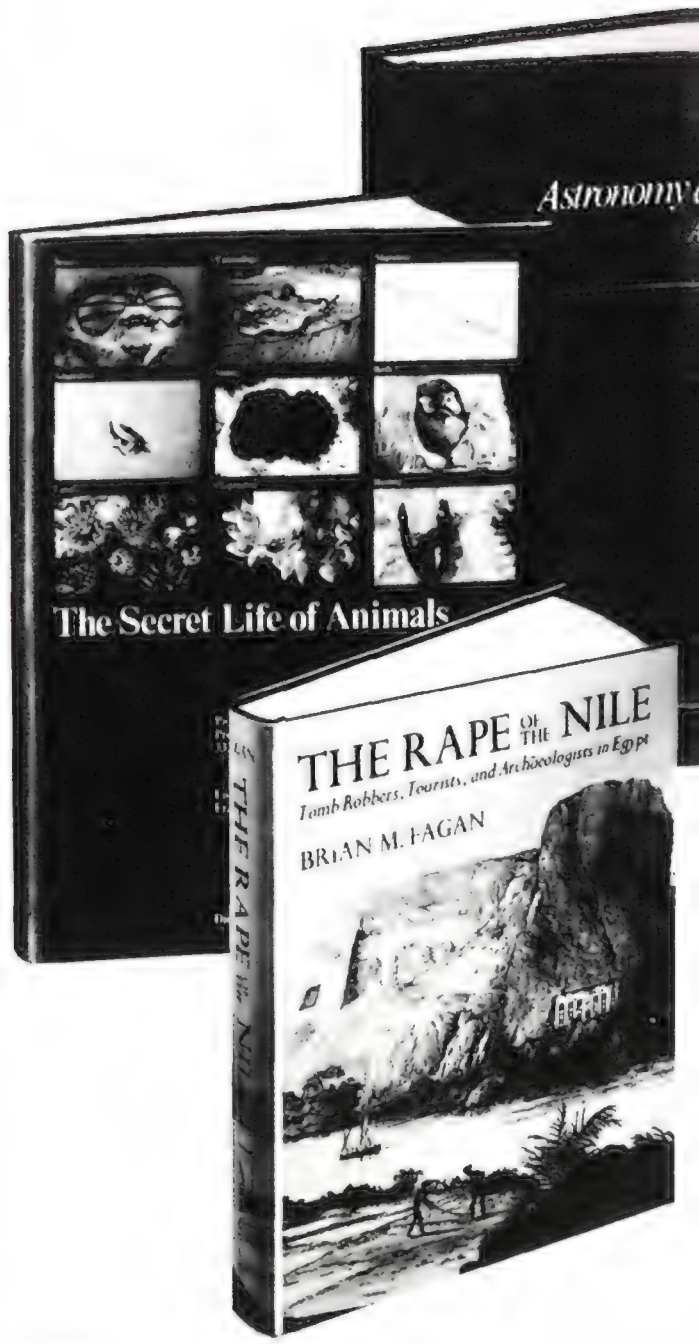
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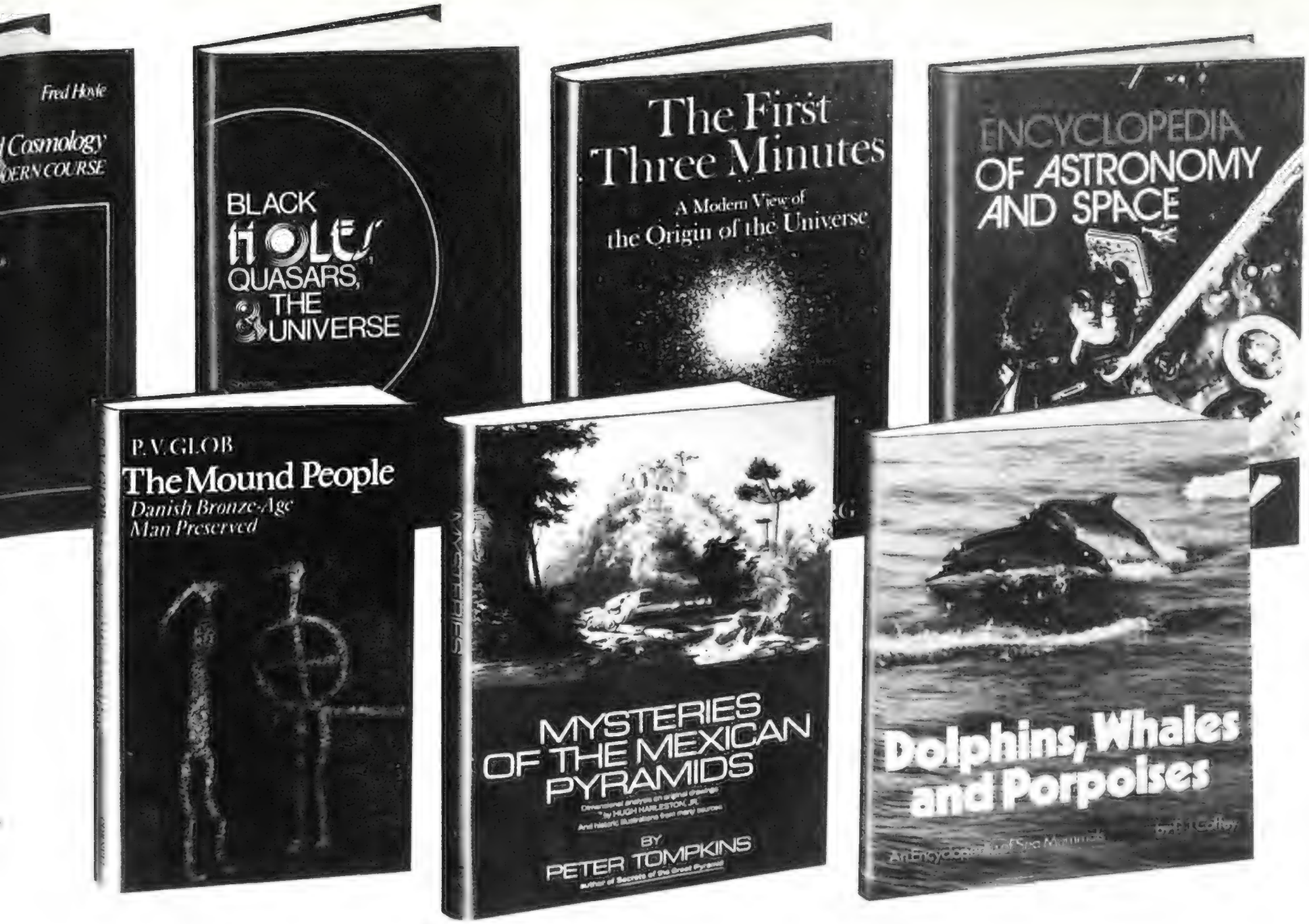
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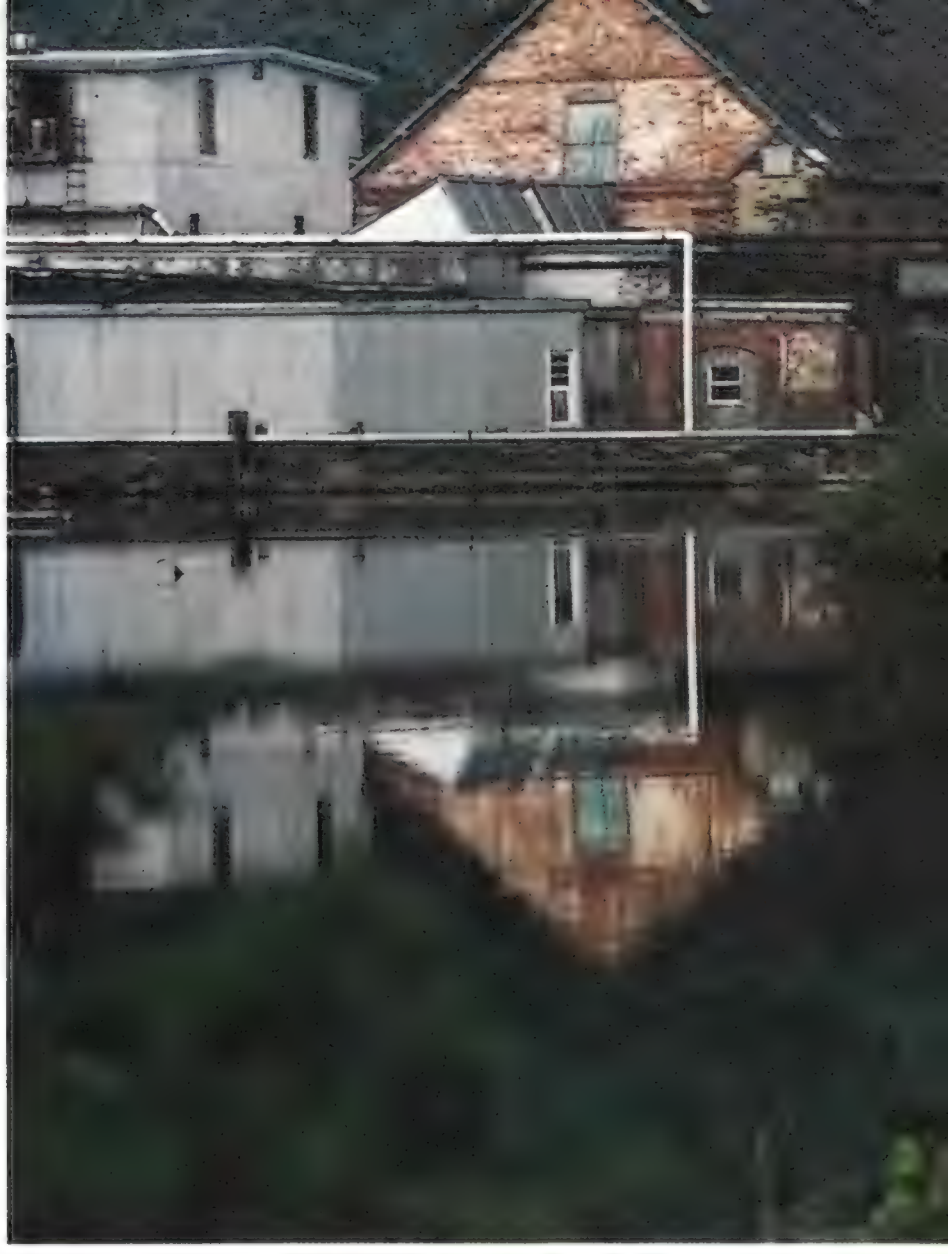
By David E. Lilienthal

Lost megawatts flow over nation's myriad spillways

An expert on large-scale power argues that use of existing minidams could replace millions of barrels of precious oil



As late as 1970 this paper mill on the Housatonic was still generating some of its own electricity.

Energy, we are told, is to be the nation's number one domestic priority for the rest of the century, and we are advised by high authority that the only course immediately open to us is to use less of it.

No one would advocate waste and inefficiency. All the same, using less energy is patently a solution only for the short term if this still youthful country is to go on growing, which is what we may expect from its natural habit and previous behavior. In that case, we will need to consume more energy, not less. Even as a short-term solution, conservation will not work unless the citizen is persuaded that the sacrifices he is called upon to make are necessary.

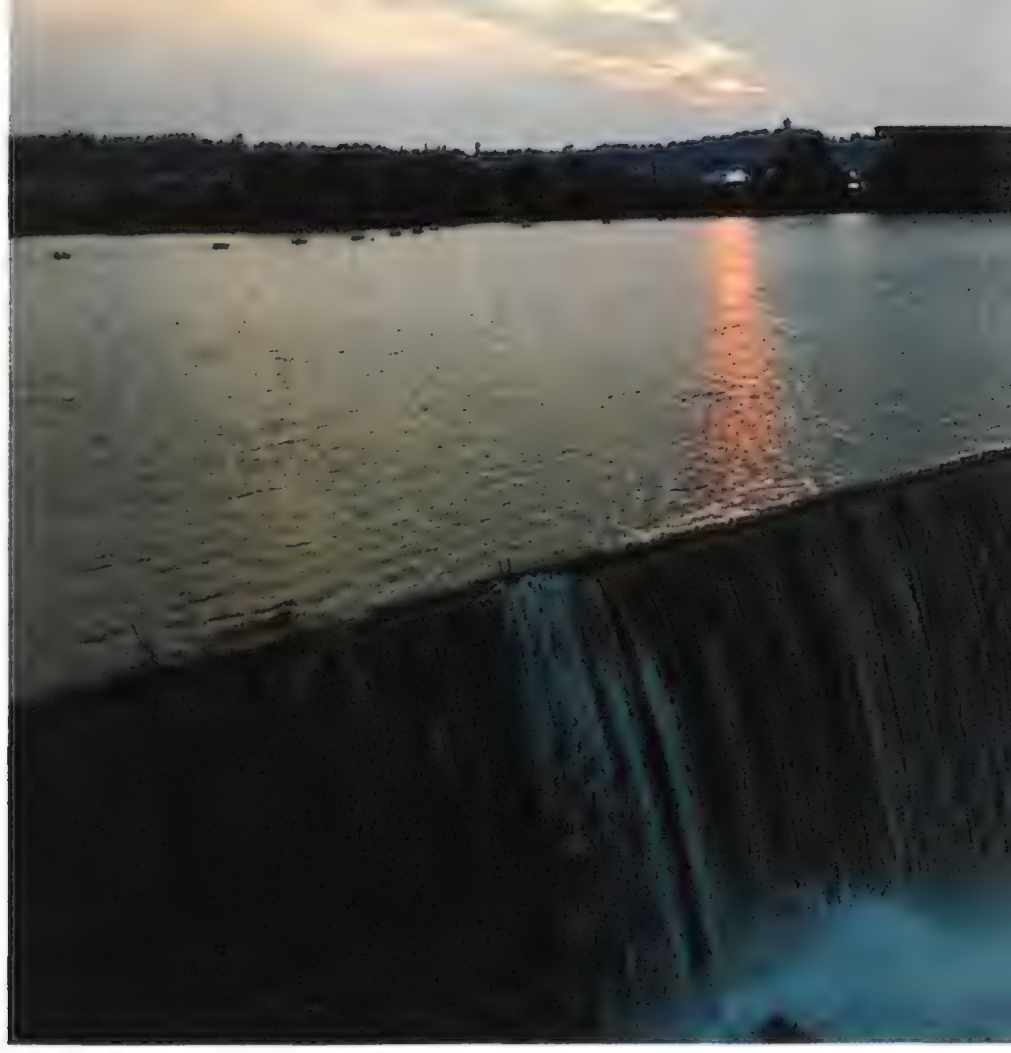
I doubt whether he will be so persuaded if he finds out that a satisfactory additional source of energy readily available to us is neglected—the moving waters of our rivers and streams. This is a resource very substantial in volume, for more than half of it is still to be developed; it renews itself, unlike oil and coal and uranium; and its cost will not rise as the years roll on. It provides a form of energy which does not pollute the air, and need not make a violent impact on the environment; it is widely, though not uniformly, distributed throughout America, and is often available right where it is required.

Tannery Falls, Savoy, Massachusetts, lies downstream from once-flourishing gristmill and tanning works.

I said *need* not make a violent impact on the environment. Especially where dams have already been built, there should be no impact whatsoever. Why, then, are we not doing more about them? Partly, no doubt, because our society has become preoccupied with bigness, and most of our hydroelectric potential is small in scale. We seem to think automatically in terms of huge regional transmission systems and million-kilowatt, multibillion-dollar projects, and can no longer conceive of 5,000 kw, 10,000 kw, or even 20,000 kw as practical. However, a new study by the Army Corps of Engineers estimates that installation of additional generating capacity at existing dam sites could add 54,000 megawatts to the nation's power pool. A Federal Power Commission study asserted that the United States has 113,000 megawatts of undeveloped hydro potential, almost twice the 66,000 megawatts of existing capacity. In addition, the FPC found that if only ten percent of our 50,000 small dams were even partially developed, we could save the energy equivalent of 180 million barrels of oil every year. Congress, in fact, has included a section on small-scale hydropower in the new energy act President Carter has requested.

I do not embrace the notion that what is small is

Photographs by George Silk



No turbines were installed in Merrimack dam at Lawrence, Massachusetts, but adjacent canals

necessarily beautiful. As one who has, for a good part of his lifetime, been responsible for the building of very large structures and systems, here and abroad, I am nevertheless skeptical of the equally extreme doctrine that bigger is better, and that biggest is best. I suggest that "bigness" and "smallness" are not exclusives but rather complementary, as they have been in the Tennessee Valley Authority. There was only one TVA, a giant, but there were more than 150 distinct and separate utility enterprises, each owned and operated by the local citizenry.

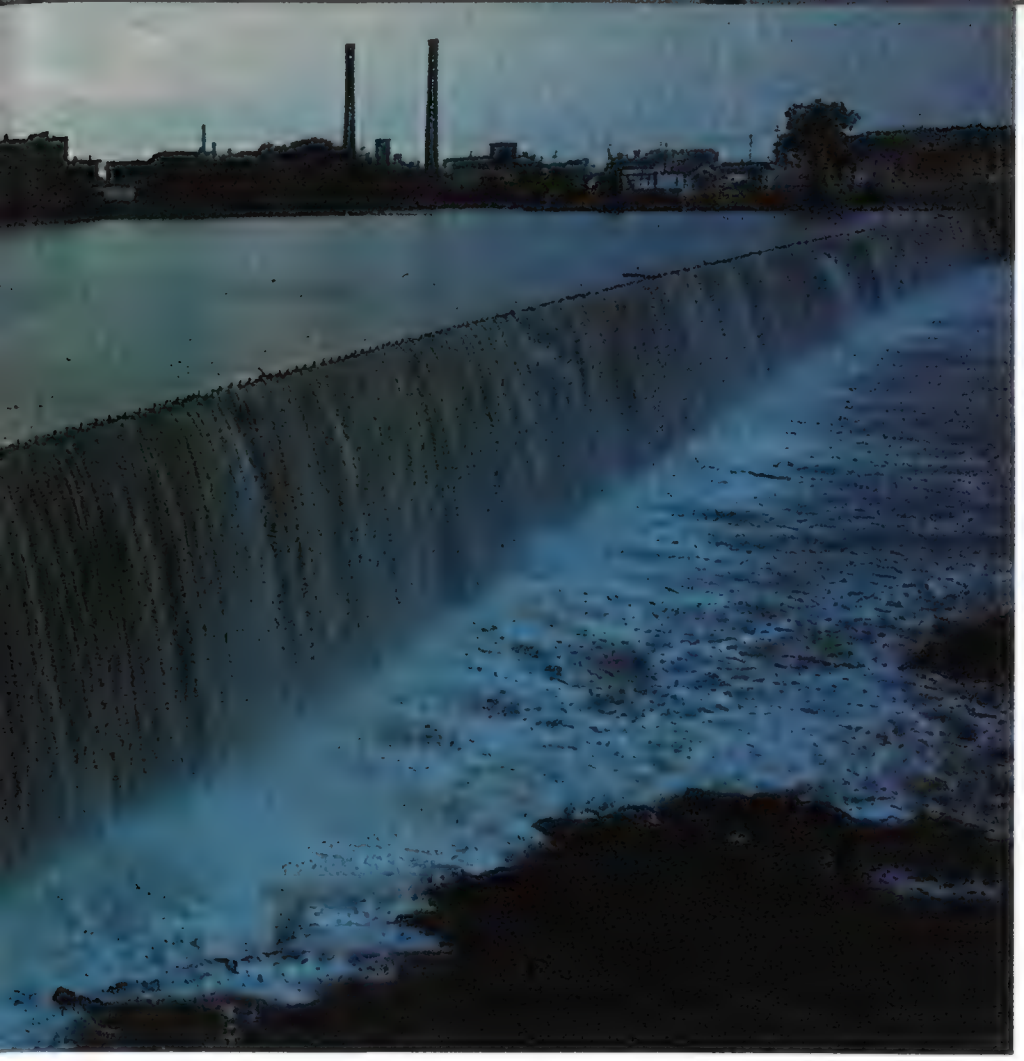
Something of that sort is surely applicable to the redevelopment of our smaller waterways. The small and medium hydropower installations we contemplate are not going to replace the great generating and transmission systems we already have, but they can certainly satisfy some of the increasing demand for energy which the regional systems strain their resources to meet. Furthermore, centralized systems are the only possible suppliers of back-up seasonal power to the small plants when their streams run low, and the only market for their surplus power when the water is high. This is a sensible, profitable alliance such as TVA worked out years ago with the Aluminum Company of America and large neighboring private power systems.

Perhaps the greatest waste of hydroelectric potential is being perpetrated in New England, that part of the country with the highest average fuel bills. Throughout the 19th century and into the early years of this one, it was an enviably prosperous region, consisting predominantly of small towns and villages, sturdy, independent, self-reliant. Out of New England came original culture, a profusion of literary and artistic talent, outstanding statesmanship, admired institutions of learning and a special resourcefulness and inventiveness known as "Yankee ingenuity," which summed up for the world at large the qualities that made America the most productive and prosperous nation in history.

For something like 150 years New England drew its energy largely from falling water. The story of its towns and villages is not the stuff of romance, it is the plain, matter-of-fact story of a people getting down to work. For example: Matthew Lyon, a fighting genius of an Irishman, who moved to Fair Haven, Vermont, in 1783 and built the first waterpowered sawmill and gristmill, hired the first teacher, erected the first meetinghouse, set up the first printing press, published the first newspaper and, among other things, sponsored an iron works and a paper mill.

The pioneer mills were followed by woodworking, shoe, textile, furniture and machine tool factories. The wooden dams were replaced by more substantial structures in stone, some of them exceedingly well built, for the workmen took pride in their calling. A stone dam at Lawrence, Massachusetts, completed in 1848, appears even now to be as sound and solid as the day it was finished (above). Later, hydraulic turbines were installed in many old dams, providing convenient electric energy to replace the brute power of the old waterwheels. The early industrial preeminence of New England, while attributable to

The author, former Chairman of TVA and AEC, now head of Development and Resources Corporation, wrote on America's future, SMITHSONIAN, *July 1976.*



do produce power, so potential for reducing dependence on expensive imported oil is evident.

Public utility in Bethel, Vermont, buys surplus current generated cheaply by private mill owners.

many things, rested to a large extent on the ingenuity with which its people captured the power of its rivers. The decline of this region today, the flight of so many industries, the chronic unemployment, the decaying communities, though attributable to various causes, have been coincident with diminishing reliance on the resource that brought its earlier prosperity.

What is especially true of New England is also true of other regions in America. There is hardly a state without potential waterpower or where waterpower is being used as fully as it ought to be. There is hardly a state whose citizens do not tell us, with some asperity, of dozens of old hydropower sites abandoned.

Why has it happened? The answer is not a complex one. We were persuaded to accept the fashionable idea that great new generating stations and huge, regionalized transmission systems would deliver electric energy more efficiently and at lower cost to the public than small, local, decentralized ones. Nobody foresaw what would happen to the cost of oil and gas and coal, or to the cost of transporting these fuels, or to the cost of constructing huge generating plants and mighty transmission lines. No one foresaw the rapid diminution of the world's reserves of oil. We placed major reliance upon nuclear energy, without being fully aware of its costs or its hazards.

However, this is much more than a matter of economics. The disappearance of so many of our small and medium-sized hydro installations has wrought some social and community disadvantages as well.

Sawmill in East Bethel, once waterwheel-driven, may be reconverted owing to rising fossil fuel costs.

Latent energy untapped, surplus water cascades over spillway of Great Falls dam in Lyndon, Vermont.

Historic paper mill on Housatonic River made some power until mid-60s. Hydro plant is now defunct.

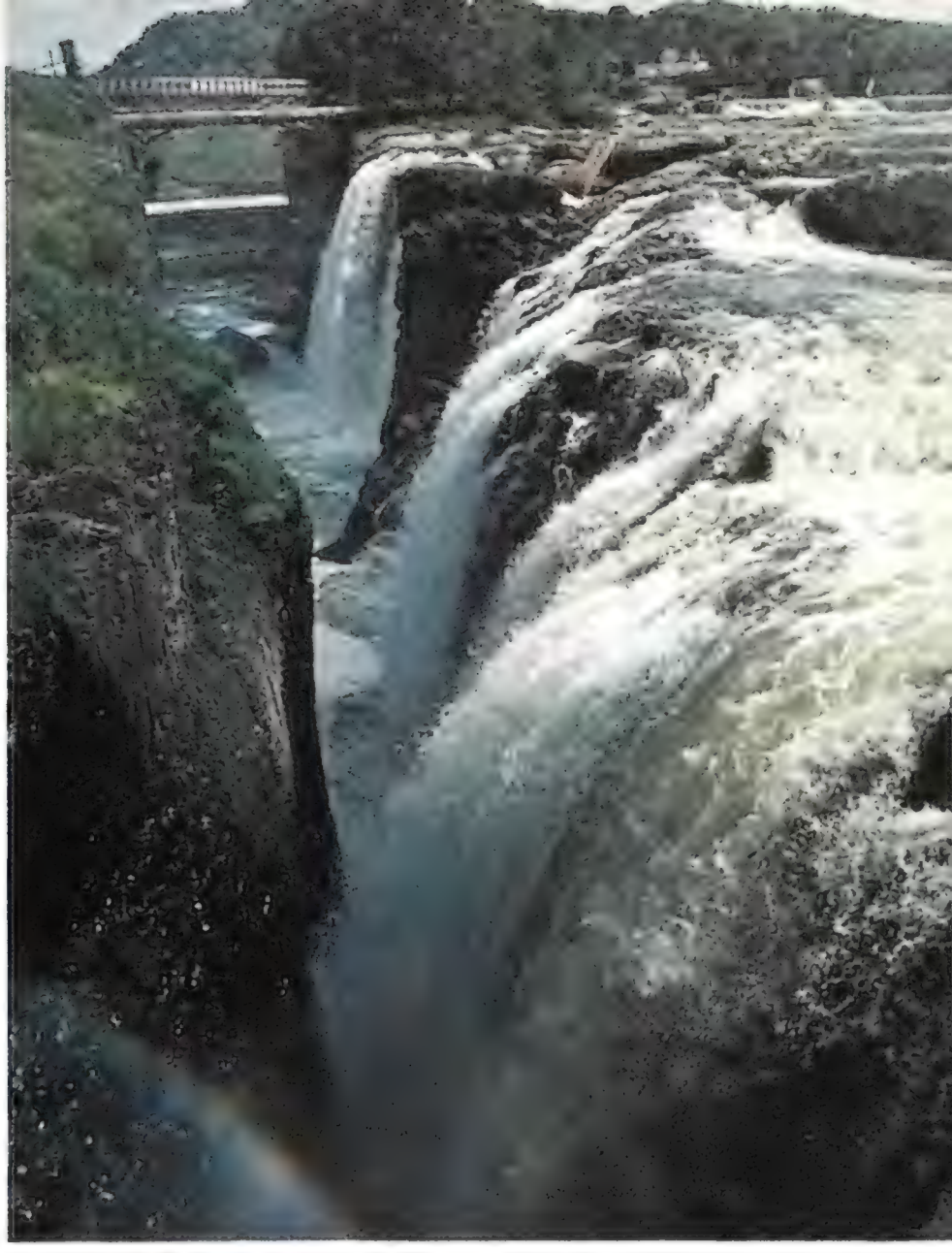
A power plant on their own stream is something that people can see and understand and take pride in, something that represents treasured associations with their past while conferring substantial benefits in the present, something peculiarly their own. It would be foolish to discount such emotions, which lie at the roots of local initiative, identity and well-being.

A new enthusiasm for restoring historic installations has begun to manifest itself. The Hagley Museum, site of the Du Pont Company's first black powder mills on Brandywine Creek in Wilmington, Delaware, for example, has recently refurbished a turn-of-the-century hydroplant that supplies almost all of the 500-kw demand for a 180-acre complex. The citizens of Paterson, New Jersey, are enthusiastic about their Great Falls project on the Passaic River (p. 87) because it is connected with the memory of Alexander Hamilton and his Society for Establishing Useful Manufactures. The city means to renovate this early power plant, which has been allowed to stand idle because of equipment deterioration and flood damage.

The people of Newmarket, New Hampshire, have a dam and used to have a hydro plant, too; it served them well until 1955, when their utility company, in the name of progress, stripped the installations, stuffed the penstocks, and supplied power instead from a central generating station miles away, which they had never set their eyes upon. The Federal Power Commission reports that as of January 1977, no fewer than 228 small hydro plants have been abandoned in New England alone in the last 30 years.

Good hydro sites are everywhere. In Goodhue and Dakota Counties, Minnesota, a little 1,890-kw plant was shut down by the Northern States Power Company in 1966 and the lake turned over to the community for aquatic recreation. The Lake Byllesby dam, I am told, costs local taxpayers $18,000 a year to maintain, but it could have served its recreational purposes perfectly well and still earned them $25,000 a year in power revenues, if only the turbines and generators had been left intact. Twenty-six small hydro plants have been abandoned by the same utility company in Minnesota, Wisconsin and North and South Dakota since 1930. These states are not the best-endowed in waterpower resources, but they have been made to appear worse off than they really are.

I do not accuse the utility companies of malignity



Paterson, New Jersey, will renovate a Passaic River installation idled by age and some flood damage.

or even carelessness in pursuing this course. I can readily believe that at least some of these plants were not profitable to operate in the conditions of the times, and the utility companies were no more prescient than the rest of us before the oil embargo of 1973-74. I do take them to task—with some honorable exceptions—for their reluctance to recognize, even in our present extremity, the value and the extent of our wasted waterpower resources.

In the Federal Power Commission estimates I mentioned earlier, only about 1,400 of the 50,000 small dams have been developed for power generation, the rest for the improvement of river navigation, flood control and irrigation. There are 343 flood-control dams in the northeastern United States (229 in New England alone); many of them can be made to accommodate power installations without compromising their original function. Take Mount Morris Dam on the Genesee River in west central New York. When the Army Corps of Engineers built it, they prudently built in penstocks as well and one day Buffalo and Rochester may be grateful for them, because the 40,000 kw this dam will accommodate is not a trivial increment in a state which needs power as badly as any other, and pays dearly for what it already gets.

As for differences in water levels in the irrigation canals of the Far West, FPC-published reports omit all projects with estimated capacities of less than 5,000 kw. How many of these there are, and what they might someday contribute, is conjectural.

The same might be said about the total potential capacity of the navigation dams on the Ohio, Arkansas and Mississippi Rivers, to mention the three most obvious cases. It may amount to millions of kilowatts. I do know that the enterprising city of Vanceburg, Kentucky, is already taking steps to install 210,000 kw, a very sizeable asset, in three navigation dams, already built, to which it has access. The Corps of Engineers has counted more than 49,000 dams in this country of at least 25 feet in height, which means an ample head of water for the production of power by the new, low-head turbines, yet only a thousand or so are actually equipped to produce power.

The size of an installation does not matter. The 500-kw plant at the Hagley Museum is as worthy a testament for conservation and against waste as the 50,000-kw plant. We know, on the plentiful evidence afforded by plants belonging to villages, municipal-

ities, industries and some utility companies, that the small hydroelectric facility, generating a few hundred kilowatts, a thousand or five thousand, is important, since even 5,000 kw can serve the needs of several thousand families.

These small- and medium-sized projects can be developed at lower capital costs per unit, and will produce energy at lower production costs per unit, than we are likely to get from huge new generating stations using less permanent, less reliable, more hazardous resources. Moreover, they can be built quickly, compared to the 10 or 12 years required nowadays to design, license and build a large coal-burning or nuclear plant. What inflation and interest charges add to costs over such long periods is something the consumer would rather be spared.

What will these little projects mean? Lighting for schools, streets, parks and other communal purposes, at prices lower than the norm. They mean power at a price that will permit small industries to stay in business and keep on employing people. But they will mean something much more important than these advantages, in my view: while Congress debates energy policy, while the courts and learned experts discuss environmental trade-offs, while economists pontificate, people, in their own communities, can do something to help themselves. In fact, as we have seen, they have already begun. In a few years there may be thousands following in their wake, for the challenge of overcoming obstacles and conventional attitudes comes naturally to us. Private citizens can show officialdom what conservation really means.

Village of Lyndonville, Vermont, earns a profit from 600-kilowatt plant on the Passumpsic.

By Israel Shenker

Scholars' meeting room at the Archive Center re-creates JDR jr.'s office at 26 Broadway.

House that holds Rockefeller riches (papers, not $$$)

A mansion nobody ever lived in has been converted to contain archives of the family and its far-flung philanthropies

Bust of senior Rockefeller at age 81, done by Paul Manship in 1920, stands in the foyer.

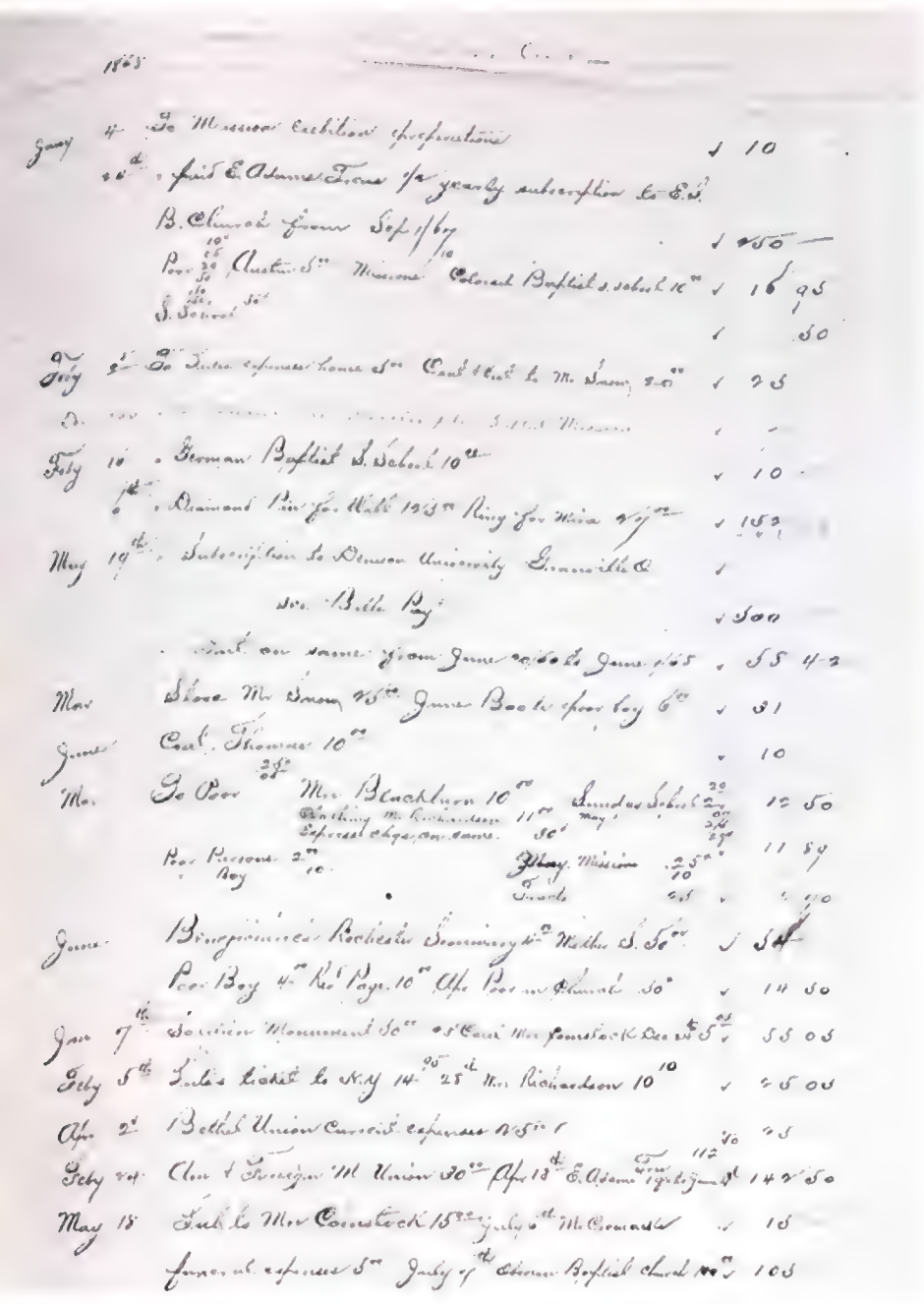
The plaque at the Rockefeller Archive Center is discreet, the approach obscure (from Lake Road east of Tarrytown in New York's Westchester County), and stillness hovers over the 24-acre estate created for, but never inhabited by, a Rockefeller widow.

Catalogued within the big fieldstone mansion in the rolling Sleepy Hollow countryside are 20 million pieces of paper, the documentary treasures of the family and its widespread philanthropies.

Here are the papers of the patriarch, John D. Rockefeller (1839-1937); those of his youngest child, JDR jr. (1874-1960), are expected eventually. With such precedents, it seems likely that the archives of Junior's offspring—John D. 3rd, Nelson, Laurance, David and the late Abby and Winthrop—will follow one day, too.

The personal ledgers, journals, account books and expense vouchers of Senior, as the archivists have dubbed the founding father to distinguish him from his only male heir, provide lively, compelling reading. But these family papers and scrapbooks represent only a small fraction of the collection, a fourth of which is now open to scholars.

Photographs by Henry Groskinsky



An 1868 page from youthful Senior's tidy pocket account book shows philanthropic bent.

The vast bulk of Rockefelleriana lies in the accumulated archives of its philanthropic institutions and agencies. They include, among others, The Rockefeller University, founded in 1901 as the first American institution devoted solely to biomedical research; the General Education Board, which appeared on the scene two years later and was to make a major contribution toward the betterment of education for blacks in the South; and the Rockefeller Foundation, that Olympian endeavor founded in 1913 "to promote the well-being of mankind throughout the world."

Eminently more than a family's stately paper-filled home, the Center is a rich source for the histories of 20th-century science, education, medicine and social welfare. Rockefeller University, formerly the Rockefeller Institute for Medical Research, has produced 16 Nobel laureates to date, and the papers of ten of them are now in the open collections here.

"Full disclosure of the past is as important as the publishing of current work," suggests Dr. John H. Knowles, president of the Rockefeller Foundation and once general director of Massachusetts General Hospital in Boston. The Foundation has provided the Center with its own archivist, Dr. J. William Hess, formerly a curator at West Virginia University. Rockefeller University has formal title to the property, and Dr. Joseph W. Ernst, who served as archivist of the Rockefeller Family & Associates, is director.

Hillcrest was meant to be the home of Martha Baird Rockefeller, second spouse of John D. jr. (he was her third). She helped plan the Georgian residence of 30-odd rooms, but became ill before it was completely furnished and never spent a night there. After her death in 1971 the house and estate went to the Rockefeller Brothers Fund. Then it seemed wise to convert Hillcrest into one grand, united archive for the entire Rockefeller establishment. After all, the du Ponts, Fords and Firestones already had theirs.

The house stands across from a 249-acre park, the heart of the Rockefeller family's 3,500-acre estate, Pocantico Hills. This lush enclave contains Kykuit, the original Rockefeller residence which Senior had constructed in 1909 and which has been occupied, on and off, by Nelson and his family since 1960. The other brothers have residences nearby.

Kykuit, Dutch for "Lookout Hill," commands an exceptional view of the Saw Mill River valley, the

Built as a home for the widow of JDR jr., Hillcrest has been converted into the Rockefeller Archive

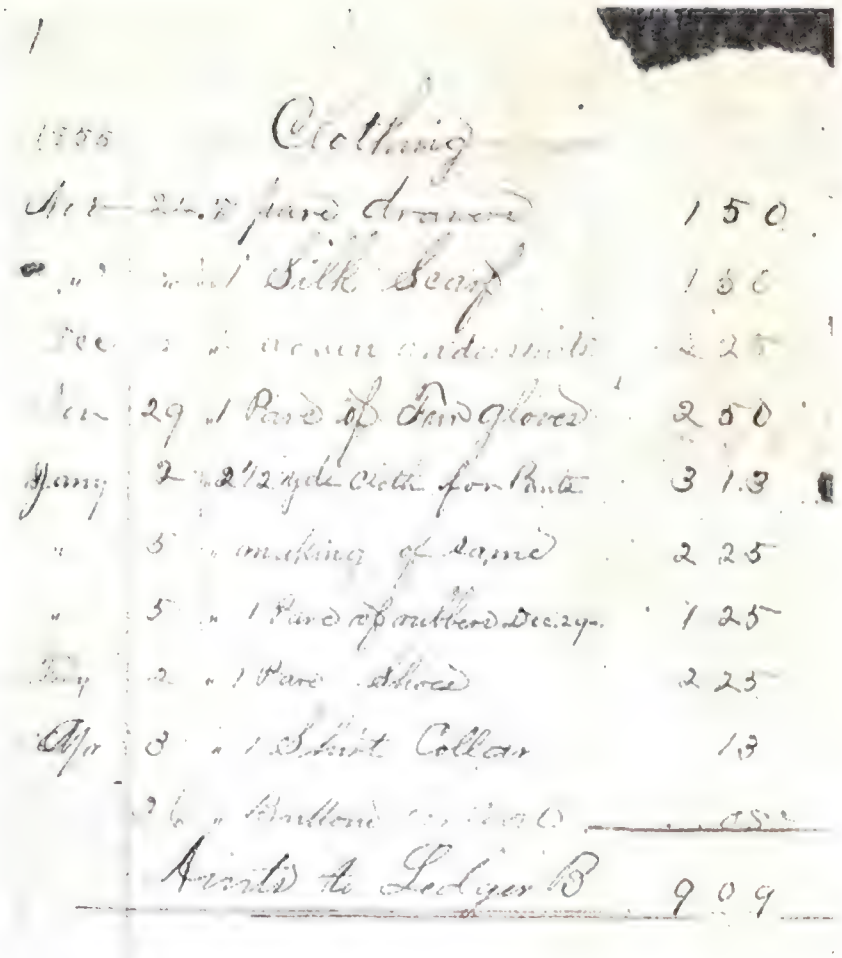
Israel Shenker, former Time *and* Life *correspondent, works as a reporter for the* New York Times.

Hudson and its Palisades. Senior first bought the property for a country retreat in 1893, four years before his full-scale retirement. The estate was designated a national historic landmark last year.

Across the road, at Hillcrest, what began as a mansion for an elegant, artistic woman had to be transformed into the kind of glossy but durable warehouse suitable for Rockefeller memories and memoirs. The Rockefeller Brothers Fund provided $4.5 million. A good portion of that went toward the construction of 11 concrete vaults, where temperature and humidity are controlled to assure the collected papers of maximum longevity. The vaults are studded with smoke detectors linked to the local volunteer fire department, and to containers of Halon gas designed to snuff out flames before they can do much damage.

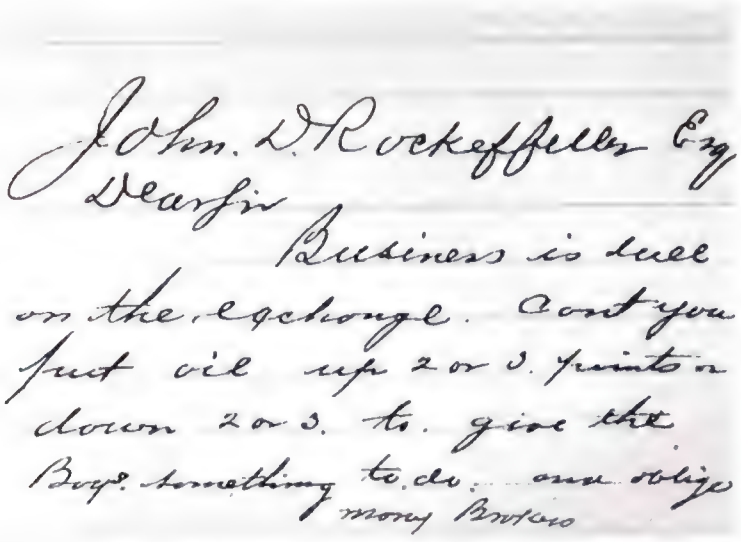
The living room is now a conference room, where occasional meetings take place—a gathering of archivists discussing professional ethics, a colloquy on "The Scholar's Right to Know vs. the Individual's Right to Privacy" or, perhaps more appropriately, a conference on "The Role of Philanthropy in American Society." Above the fireplace hangs a Chagall sketch of Christ on the cross titled *The Good Samaritan,* which David Rockefeller contributed as a tribute to his father. The adjoining room was intended to be a music room for Mrs. Rockefeller, a onetime concert pianist whom Junior married in 1951, three years after the death of his first wife, the former Abby Aldrich. Here the Center has reproduced the office that Junior had at 26 Broadway before moving into grander quarters at Rockefeller Center in 1933: 17th-century panels of dark oak, hard knobby chairs, Jacobean and Elizabethan tables.

Junior's office library is here, too. It runs heavily to the concerns of its former owner—biographies of rich men and reports on the eternal fight against the plagues of alcoholism and prostitution. If all goes well, the collection eventually should be supplemented with the copy of Karl Marx's *Das Kapital* in which JDR jr. made personal annotations.


1855 Clothing
Nov 24 pare drawers 1 50
" " 1 Silk Scarf 1 50
Dec " " women underwhite 2 25
Jan 29 1 Pare of Fur gloves 2 50
Jany 2 2 1/2 yds cloth for Pants 3 13
" 5 " making of same 2 25
" 5 " 1 Pare of rubbers Dec. 29 1 25
Feby 2 " 1 Pare shoes 2 25
Apr 3 " 1 Shirt Collar 13
26 " Buttons [illegible] 05
Amts to Ledger B 9 09

An 1855 ledger page lists clothing expenses of the 16-year-old tycoon-to-be, a meticulous penman.

Center. Along with its 24 acres of grounds, it stands next to the family's domain at Pocantico Hills.


John. D. Rockeffeller Esq
Dear Sir
Business is dull on the exchange. Cant you put oil up 2 or 3. points or down 2 or 3. to give the Boys something to do. and oblige
many Brokers

The writers suggested that Senior jiggle price of oil stocks a few points to enliven a dull market.

In 1895 JDR sat for this portrait by the then-prominent American painter, Eastman Johnson.

Dr. Ernst shows signs of lingering awe at the wealth in his charge. Great ledgers, ponderous and venerable, enshrine the record of Senior's business correspondence and investments in oil, railroads and steel, his contributions to schools, colleges, churches and the arts. Here, in 380 letterbooks, are nearly 224,000 copies of letters dispatched to further the name, fame and fortune of the family. "Only one person has looked at them all, the microfilmer," says Dr. Ernst, although one wonders whether perhaps Allan Nevins, Senior's best-known biographer, may not have been a close runner-up.

Among these letters is one to Thomas O'Rourke, a tradesman, who wanted his pay. He was told that "prices charged are not in accordance with former bills," that any picks sharpened should cost 10 cents, not 20, while picks steeled were 40 cents, not 80.

When Senior ordered a bicycle for a younger Rockefeller, he specified that it should be a "No. 22 Swell Special Bicycle," and added 11 lines of further specifications beginning "28 inch wheels, 72 inch Gear, Barrel Hubs" and ending "Also a Brake."

In small things punctilious, in large things magnanimous *and* punctilious, Senior labored to make his benefactions pay off. In 1896 he advised the assistant treasurer of the Fifth Avenue Baptist Church, where he was the leading lay figure for years, that he had placed a check for $50,000 on the collection plate and that it must be applied only to foreign missionary work.

One file contains the letters and telegrams to his wife, Laura, who bore him three daughters in addition to the world-famous Junior. Her memory is perpetuated in the Laura Spelman Rockefeller Memorial, another philanthropy whose history can be traced at the Center. When Senior relaxed sufficiently, home was where this strait-laced Baptist's heart turned. "The World is full of Sham, Flattery, and Deception," he once wrote her. "The *home* is a haven of rest and freedom."

In 1868, two years before he became president of the Standard Oil Company of Ohio, he wrote: "You better engage the man to whiten the walls (select the best man & make *best* bargain you can. I want you a splendid business Woman). . . . This bacheldor life I am *disgusted* with & I *want* to return to your bed & board & will at earliest moment. . . ."

Having once just missed a train that was afterward involved in an accident, he wrote her: "I do . . . regard the thing as the *Providence of God* . . . I am thankful, thankful, thankful. Kiss the darling Baby." Scrawled atop the letter were other comfortable tid-

ings: "The Market dull & declining—Our Money matters easy & comfortable. . . ."

The senior JDR, whose flaw, some historians think, was his failure to understand the importance of business ethics and the necessity to square his business practices with new governmental demands and regulations, had this very problem in mind when he wrote his spouse in defense of some allegations against him in the matter of freight contracts: ". . . fact is we *did* not contemplate swindling the public in *it* and it is not the business of the public to change our private contracts."

The gem of the collection is Ledger A, a pocket-size account book that he started in Cleveland in 1855, at the outset of his career, to keep close watch on assets and liabilities, with every penny in its place. Year-end totals: income $300, expenses $323.26. At that rate the Rockefeller name would have graced the bankruptcy rolls, but the very next year Senior's fortunes begin to mend, with a surplus of $154.96.

Senior was nearly 80 when he commenced on a serious, albeit rather short-lived, writing exercise: a diary which he kept intermittently for four years. When King Albert of the Belgians called in person to thank the Rockefellers for the wheat and flour sent by their Foundation to the Belgians and French during World War I, the writer recorded this observation of the royal visitor:

"After walking with Mr. John [Junior] in the garden he came into the house quite informally through one of the door windows from the west verandah."

The final diary entry, in 1924, tells of learning through the newspapers that an old childhood home had been destroyed by fire. "This was the scene of our first business venture," Senior reminisced, "when we engaged in the raising of a flock of turkeys."

By 1901, he was 200 times a millionaire

In neighboring vaults are gathered organizational and institutional records dating back to 1901, when the Rockefeller Institute came into being, and the year, incidentally, when an audit placed the value of all Senior's holdings at more than $200 million.

The Rockefeller Foundation, among many other notable deeds, did much to stamp out yellow fever throughout the world and in 1917 started the Peking Union Medical College, which was to be nationalized by the Chinese Communists 34 years later. The Foundation's medical experts roamed the world on tours of inspection and assistance. Back to New York came detailed reports from executives in the field.

The Center also holds the archives of the General Education Board and the International Education Board, which together disbursed more than $350 million. A 1904 letter from Booker T. Washington to the General Education Board, set up to aid U. S. education "without distinction of race, sex or creed," complained of sharp practices in the selling of Bibles to his fellow Negroes. He hoped the Board could do something about it.

There are the documents on formation of the Rockefeller Sanitary Commission (1909-1915) and its domestic fight against hookworm, and on plans "to extend the work for the eradication of [the parasitic] disease to foreign countries." The attack was pioneering and successful, as was the Foundation's antituber-

In 1908 Edith, youngest daughter of JDR, had this portrait done. She had married a McCormick reaper heir.

culosis campaign in France from 1917 until 1925.

The International Education Board received a letter of complaint from Felix Frankfurter, not yet on the Supreme Court, about the failure of economists, meeting at Dartmouth College, to grapple with important issues. "You see," his letter concluded, "I put these questions to you, because you have given evidence that at times, at least, you ask yourself about your own work: 'What in hell does it all mean and whither is it tending?' "

The Archive Center takes special pride in its record of what happened when Albert Einstein petitioned for funds to further his scientific work in 1924, three years after he won the Nobel Prize. From Germany he wrote a friend who in turn wrote Abraham Flexner, then a member of the General Education Board. Einstein's first letter said that "an idea occurred to me about the deepening of the general theory of relativity, which affords the hope of solving the quanta riddle or at least of coming closer to the solution of it. However, the execution of my plan by computation transcends my individual powers, but I believe nonetheless that I would be able to approach this execution with brighter chances were I to get the aid of a theoretical assistant . . . I believe that $360 per annum would be a correct figure."

Eager to help, the International Education Board, whose realm, unlike its sister board, was overseas, sent off a check. It then learned, from an intermediary, that "Einstein has either mislaid or lost this check and letter or someone has stolen it from him. . . . Could you perhaps be so kind as to send him discreetly a duplicate of this check?"

Flexner, the distinguished supporter of medical education who in 1930 went on to organize the Institute for Advanced Study at Princeton, replied: "Your letter about the Einstein check naturally amused me very much. The last doubt is removed. Einstein is a great genius. Nobody but a great genius would be so careless in the handling of a check."

One of the unheralded treasures of the Center stretches along the corridor between the vaults, 38 feet of Rockefeller genealogy on brown wrapping paper, the off-duty work of a staff archivist. This genealogical ticker tape has entries from 1810 to the present, although the family line has been traced back to 1590 and Germany, to Goddard Rockenfeller and the village of Rockenfeld.

By family legend there was at least one distinguished forebear in the 18th century, a certain Miles Avery. Senior had come to believe that this great-grandfather of his had, during the American Revolution, been errand boy, clerk and assistant to General Washington. He therefore sent inquiries to state capitals and the nation's capital to research his patriotic roots. Back came the news that the boy of legend had really been a mere noncom from Connecticut.

Since the Center opened in 1975 nearly 200 scholars, mostly college professors and PhD candidates, have used it. The amenities are few, the rules firm. And, yes, the archives of the same old gentleman who used to give away dimes charge ten cents a page, as do many other library establishments, for any photocopying done on the premises.

Center Director Dr. Joseph W. Ernst at work in stacks, down in archives' fire-resistant vaults.

An 1840 portrait of Queen Victoria, once hung in Junior's Park Avenue place, is now in powder room.

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By Matt Herron

Sea and shores as classrooms

What happens when you snatch youngsters from TV and their schools, head across the Atlantic on a 31-foot sloop? They get educated

It was a night of inky calm. No moon. The sea, released at last from a three-day gale, lay at peace. Overhead the sails hung slack and ghostly.

Off to the east, less than 100 miles into the blackness, lay our destination, the west coast of Africa. Although we could almost taste it after 60 days of eastward voyaging, nothing would move our family closer to that goal this evening. Instead, we turned our eyes upward. The stars held us, mystified us—and all at once we had to know more.

"Matthew, go below. Get the Bowditch," my wife, Jeannine, suggested. Our 13-year-old son rummaged in the navigation shelf for the weighty tome that has guided sailors since 1802, has been bible to my own pathfinding, and also contains the most opulent star charts I know of. Melissa, our daughter of 11, found a flashlight and binoculars. Astronomy class convened without delay on the foredeck of *Aquarius,* the 31-foot steel sloop that had been home to the four of us since sailing from New Orleans in July 1970.

For perhaps an hour we followed Nathaniel Bowditch and his *American Practical Navigator* across the February sky. Beginning at the apex of the heavens with Capella, we skirted the Seven Sisters of the Pleiades (it required binoculars to convince nearsighted Jeannine that the smudge above her was actually a cluster of seven discrete stars), then dropped down to Regulus and to Sirius, the wondrous Dog Star flashing its blue, green, red and icy white signals like a demented traffic light. We visited the Gemini

Two young Herrons and their mother explore an aqueduct on La Palma, Canary Islands.

Twins, Castor and Pollux, Taurus, the eye of the bull, Aldebaran, the faithful follower, and some others. As we retraced our steps again and again we discovered we could glance up and name them. We got to know the neighborhood, so to speak.

What a distance our thinking had come since we first considered pulling our children from the New Orleans public school system, sailing them across the Atlantic to Africa, and educating them ourselves. Everyone thought it was a terrible idea—the grandparents, the children's teachers, most of our friends, even the reporter from the New Orleans *Times-Picayune,* who, in a feature story about our departure, had wagged his editorial finger at us: "One is tempted to ask about a parent's responsibilities toward his children." After viewing the effects of various institutions on our children's natural curiosity, we felt we had been *abdicating* responsibility for their education. Only now were we beginning to assume it. As Jeannine wrote to her parents before we sailed, explaining why we did not regret taking our children out of school for a year and a half:

"For the most part children are being smothered in American schools. They are led, pushed and ordered, without humor, into lives of boredom and conformity. They learn life by rote. The more they watch TV, the more they will depend on the vicarious rather than the real . . . somehow we must provide Matthew and Melissa with experiences that will teach them to survive to their fullest potential in a world that seems every day more treacherous. . . . Children go through our school systems and emerge with no real resources because they have spent all that time

Matt Herron follows his Voyage of Aquarius *with a book about Greenpeace Foundation's battle to save the whales* (SMITHSONIAN, *August 1976).*

Jeannine Herron hiked deep into carless Abuko Nature Reserve, Gambia, and met this baby chimp.

Matthew and Senegalese friend study a sand crab on island of N'Gor, just north of Dakar . . .

. . . and the crab is quickly immortalized in Matthew's burgeoning science notebook.

pursuing work someone else wanted them to do. Learning new facts isn't enough. They never have a chance to *produce* anything really useful, or to learn in a way that's related to the world outside school."

Brave words, but how to ensure that *real* education, not just an exciting adventure to write home about, would take place aboard our school ship?

Mathematics and astronomy, we hoped, would develop from navigation; language and social studies from our contact with foreign cultures; science from encounters with the sea and the weather. Composition? Well, the master of a merchant vessel is required to record the events of his nautical life in a daily deck log. Although the same requirement doesn't extend to private yachts, log keeping seemed an excellent path to lucid writing.

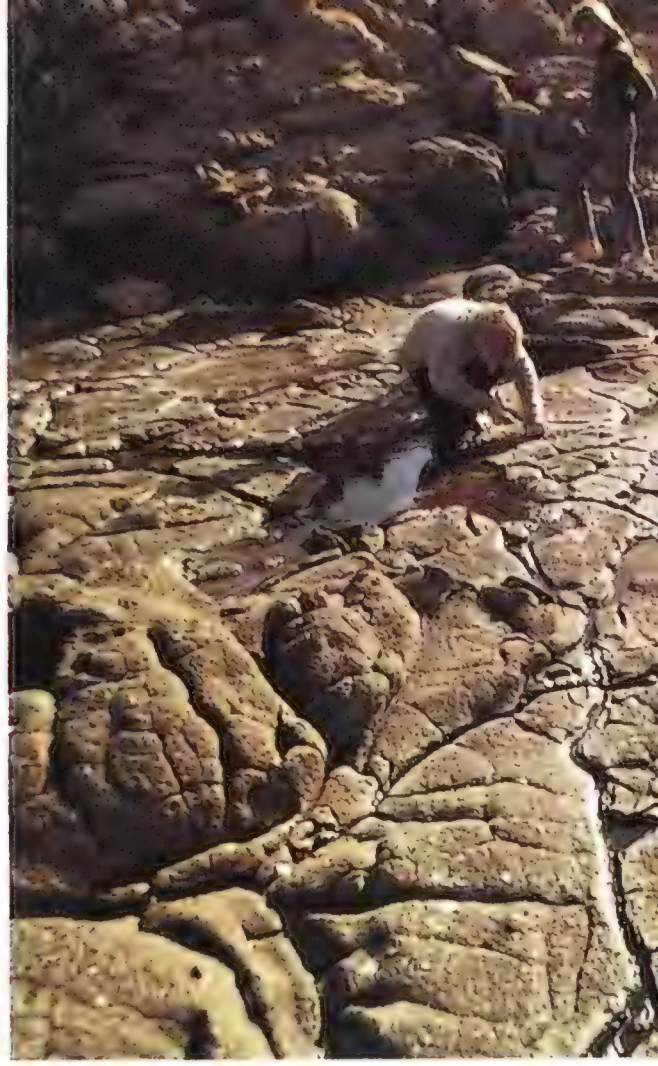
Choosing books for the voyage

Jeannine stocked our educational larder with zest. She began with forays on the local bookstores: *The Lower Animals: Living Invertebrates of the World, Dictionary of Fishes, Dangerous Marine Animals, The Year of the Whale, The Coast of Coral, Science on the Shores and Banks, Curious Naturalists, The New York Aquarium Book of the Water World,* a shoal of others—they would serve to stuff us with marine facts.

Marine fantasy was another matter. Gradually a flotilla of classic and modern sea tales found their way onto our bookshelves. The Horatio Hornblower series by C.S. Forester, and works by Jack London, Jules Verne, Joshua Slocum—the first man in history to circumnavigate the globe single-handed—Robert Louis Stevenson, Joseph Conrad, Herman Melville, Mark Twain, to name a few. We packed in more than 150 volumes ranging from sea sagas to science fiction (for Matthew), Nancy Drew mysteries and horse stories (for Melissa), a complete shelf of African political and cultural history (for ourselves), animal behavior studies, Portuguese, Spanish and French dictionaries, and a whole range of miscellaneous titles from *First Aid Afloat* to *The Joy of Cooking.*

When we had finished, the boat seemed paneled with bookshelves. Did we hope for too much? Reading was not a natural pastime with our children. They had grown up in a television world. Pictures were normal, words suspect. From illustrations alone Matthew could assemble an intricately detailed model, puzzle or scientific gadget. He seldom bothered to read the instructions, had never in his life read a book from cover to cover. And though Melissa might occasionally be found curled up with the adventures of Black Beauty, both children, if allowed, would sit hour after hour glassy-eyed before the glowing cath-

Melissa and Matthew learn to tie-dye and stamp batik in Banjul (formerly Bathurst), Gambian capital.



The Herron children search tidal pools among the rocks of N'Gor.

ode-ray tube, physically inert and, so far as we could tell, mentally vacuous.

As we wore our way across the Atlantic, I noticed more and more volumes in my children's hands. They read privately at first, and then with mounting mutual enthusiasm, recommending books to each other and even discussing them with us. Soon it became a chore to pry Matthew out of the forepeak or Melissa from behind a fortress of pillows on the afterdeck when it came time for their watch. One afternoon Melissa, her hand on the tiller and her nose in a book, almost ran down a freighter, so engrossed was she. Near the end of the voyage when we had recycled our library through several bookstores and U.S. embassy exchange libraries, I asked the children to make a list of their reading. Matthew wrote down almost 100 titles, and Melissa nearly 200.

Matthew used words well almost from the beginning, but he is left-handed and disliked writing because penmanship was difficult for him. Spelling, to put it kindly, did not come naturally, either.

His early log entries were practically illegible. Fortunately, his phonetics could be worked out: "On ocation we said the plej of alegenc." He was called upon to "interpret" so often that he asked Jeannine

Matthew curls up with a book in a sailor's hammock on the deck of little *Aquarius*.

Jeannine, Matthew and Melissa join
a wedding party of friends in Sierra Leone.

to teach him writing. He found the typewriter the best solution. He and Melissa used a self-teaching book, and built a special table to hold the typewriter against the roll of the boat. By voyage's end, his accounts filled several notebooks.

Our school's finest hours came, not at sea, but during the month we camped in an American embassy beach house on N'Gor, a tiny island in a small bay just north of Dakar. Each weekend the island teemed with escapees from the consulates and foreign-owned businesses of the city, but otherwise it was ours alone, and all week Matthew and Melissa roamed sheltered beaches or explored coastal ledges. There, among the tide pools, they fell into a passionate study of marine animals that Jeannine and I found infectious. Here were thousands of tiny declivities, each nesting a spiny sea urchin. In absorbed, unselfconscious partnership, the children picked their way across this prickly landscape, calling out new discoveries, cooperating in the capture of a fish, delving for hours in the miniature ecosystems that flourished in every brimming pool.

Melissa acquired so many captives that we improvised a saltwater aquarium for them from the embassy's plastic dinghy, filling it with sand, seaweed and frequent changes of fresh sea water. In this less turbulent environment, the children began a more or less systematic examination of various life cycles. They began to keep biology notebooks, writing down as many observations as they could, making detailed drawings of the animals and later checking our marine biology library to see what they had missed. Melissa was particularly fascinated by sea slugs. She would hang over the side of the dinghy for hours, scrutinizing them without embarrassment during copulation, egg laying and elimination (sea slugs are extraordinarily blasé about such things). She discovered what they ate and how they ate. She searched carefully for eyes and noted that they had none.

Several days later Matthew came to report smugly, "I found their eyes." We went to confirm this, suspiciously, because none of us had been able to discern eyes. Sure enough, two of the tiny spots on the head which had appeared identical to all the other frecklelike spots, revealed on closer examination a unique glint, a brighter aspect than the others. Someone in there after all! Scooped, Melissa went off grumbling to correct her notebook.

The high points of our educational experiment were certainly experiences like the N'Gor tide-pool study, but the fruit was in everyday encounters, simply a part of travel, that defy evaluation. How does one gauge the effect of playing soccer with Portuguese children in the Azores, of frolicking with half-tame baby chimps, of learning to make African tie-dyed cloth in Banjul at the mouth of the Gambia River, of being "it" for Simba, a weird African combination of tag, dodge ball and show-and-tell?

For that matter, what is the value of "character education"—a concept so old-fashioned it no longer is

a fit subject for our schools? Does standing watch on a cold and blustery night foster "character"? Does enduring the discomfort of a gale, or turning out of a warm bunk to help keep the boat off the rocks in a harbor storm? In moments of stress we really needed Matthew and Melissa to haul lines, solve problems, or prepare warming food and drink that we could not easily have done without. In every instance they responded with such courage and determination that we soon realized we'd underestimated our kids.

Our voyage has taught me this: children need real adventure—they can't get it from Captain Kangaroo. They need travel; they must see with their own eyes that the world is wide and is filled with wonderfully diverse people—all leading lives as interesting as their own. They can't know this from watching television travelogues. And children need situations that will test them—real situations where the outcome has not been neatly plotted in advance.

What happened to our enterprise? We ended the voyage in Ghana, 18 months out and 7,000 nautical miles from New Orleans. We shipped *Aquarius* and ourselves home, took up new jobs and new lives. The children reentered school in Palo Alto, California—Melissa at her grade level, Matthew, because of some missed geometry requirements, a year behind. That was fine by him. He'd always been the youngest in his grade and he found the new parity much to his liking. Save for some initial shyness, the children seemed to have little difficulty adjusting to school.

To update a little, Matthew, now 19, is a freshman at Princeton, with aeronautical engineering as his major interest. On the national college-entrance exams he scored in the top one percent in math, and did quite well in other subjects. Melissa, now a 17-year-old high-school graduate, has decided to take a year off to think things over.

My children have signed off as crew members of the school ship, *Aquarius*. The remainder of the voyage is theirs to plot and navigate as best they will.

Matthew and an African chameleon stare at each other in the region of Casamance, Senegal.

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By Philip Kass and Michael Olmert

Violin-making as American art

An American professionally built mute violin; bridge could be lowered or raised for string tension.

Not widely known is the fact that the fine craft of constructing violins came early to America, and flourished

The Philadelphia violin-maker and inventor Charles Francis Albert was no robber baron. But he did properly see the late 19th century as a time for making money, specifically making money by giving a growing American public something it needed and wanted. And to Albert's mind, that something had to be a mute violin, one designed just for home practice. Not a regular violin with its f-holes stoppered or with its four strings somehow silenced. True, there had been some makeshift affairs, but Albert felt the need for a finely crafted instrument, distinguished by a total inability to produce sound—one that could not wake, or otherwise disturb, the neighbors.

Albert set to work in the early 1880s. His creation in a version shown here dating from 1886 (above right), did not make him rich—even though the new design, unlike a regular violin, could be lavished with inlaid decoration without affecting its sound. Although there were few customers for Albert's invention, the story of the mute violin does tell us something about American craftsmanship and self-reliance.

Violin-makers are called luthiers—so named from the antique lute. The fact is that violins were around for some time before American luthiers took up the trade, which probably began when Jubal in the Old Testament first tied a few cords around a shell. Violin-making reached its peak in 17th- and 18th-century Cremona, Italy, at the family ateliers of the Amatis, the Guarneris (of whom the most famous was Giuseppe, known as Guarneri del Gesù) and of course Antonio Stradivari. The violins they made are unrivaled in their tone and workmanship. And they are still played—to marvelous effect—by today's concert virtuosi lucky enough and wealthy enough to get their hands on one. At a recent Christie's auction in London, a previously unrecorded Stradivarius from his early period, dated 1692, was sold for $80,000.

To be sure, there were other luthiers of note, such as the Germans working in the schools at Mittenwald and Markneukirchen and the French 19th-century maker J.B. Vuillaume, but the Italians centered at Cremona had given the world the violin as we know it. Together, the Cremonese luthiers had invested more than two centuries of development in their instruments. They experimented with glues and varnishes. They tried different woods and different ways of cutting, planing and shaping them. Searching for the most resonance, they cut countless shapes for the f-holes. Over those two centuries, the Cremonese developed all the sights and sounds we have come to associate solely with violins.

By the time of the American Revolution, the history of violin development had been largely played out. And the violin's "configuration," as one of today's technocrats would put it, had been settled and agreed to by that final arbiter of a great many crafts and arts, tradition. The problem was that tradition did not travel well.

But the Colonists didn't need to worry. Their self-confidence and Yankee self-reliance were capable, as

There is a lustrous symmetry and elegance in these instruments, lined up and awaiting inspection.

Color photographs by Hank Morgan

history has demonstrated, of stepping into the breach.

Early American instruments are thus monuments to these traits. Equipped with a few European models, his woodworking skill and his imagination, the American luthier set to work. The ingenuity in those old instruments is readily apparent in the carving of the scroll and f-holes and in the modifications of construction. They reveal an originality and inventiveness that is very much a part of the Colonial spirit. The fact that they still sound so good is further testimony to the workmanship that was put into them.

It is also typical of the American spirit that the combination of Yankee invention and New England politics made it possible to meet a special need. As the result of a long-standing Puritan debate over the role of music in church services, the organ was frowned upon. In fact, there were organs in only a few Boston churches until well into the 19th century. Instead, a choir was used to sing the various hymns and psalms and, as underpinning, the bass voice was often doubled by a bass viol. Bass viols were thus much sought after, but their size made them expensive to import, and so an industry grew up to make them. It flourished in the New England area until the organ took the bass viol's place in the church. At that time, the industry turned to making reed organs and pianos.

A prominent and successful luthier of early America was Abraham Prescott (1780-1858), who settled in Concord, New Hampshire, and opened a workshop, in which eventually many of the leading viol makers of the day were trained. His bass viols sometimes are as large as a double bass, and many of the instruments are still played today.

Philip Kass is on the board of directors of the Violin Society of America. Michael Olmert last wrote about Delaware Water Gap (July 1975 SMITHSONIAN*).*

Typically, Prescott was among the first to use a brass worm-screw mechanism for tightening and tuning the strings. Although he had only his own bass viols in mind, every double bass in the world now makes use of this tiny refinement.

Another center of activity was Philadelphia, which, as the nation's then largest city, attracted many artists and craftsmen. Many of the earliest known American violins came from Philadelphia. An active center also grew up around Bethlehem and Nazareth in eastern Pennsylvania, the area settled by the Moravians.

They were a strongly identified community by the time of the American Revolution. The culture they brought with them was remarkably sophisticated. Although the church was the focus of their lives, the Moravians were of the Germanic tradition, where music played an important role. The Moravians also excelled in crafts, and some of the instruments for their orchestras were made by local craftsmen.

Early commercial violin-makers of prominence in Boston were the White brothers—Ira J. and Asa Warren. Both were self-taught, having studied only a few master violins. Yet, they trained an entire generation of violin-makers. Ira was the superior craftsman. His woodworking was excellent, and even his varnish—a supposed Cremonese specialty—was of good quality. The White shop opened in 1835 and remained active until the end of the century. Many of their instruments are still in use. Ira is also credited

There is no actual portrait of Stradivari; this evocation by Hamman, 1869, hangs in Cremona violin school.

with being the first to wrap his sheep-gut strings with fine metal wires to give them much more durability. Today, all strings are made that way. And no, violin strings are *not*, at least today, and probably never were, made from catgut (they are usually made from sheep intestines); that persistent rumor is probably linked to the Arab word for a young lamb, *kit*.

In time, the great midcentury immigrant flow made New York the true center of violin activity. This was the point of arrival for many of the finest European craftsmen. Their tradition began to make itself felt through the activities of the Gemünder family. In 1846, August Martin Ludwig Gemünder, trained in Germany, set up his shop in New York. He and his son, August Martin, were both highly talented and successful. The real success, however, was their cousin George, who arrived in New York later. His instruments won many awards at international competitions and were used by noted soloists.

The good and the old

George Gemünder published an autobiography in 1881 entitled *George Gemünder's Progress in Violin-Making, with interesting facts concerning the Art and its Critics in General.* His chief concern in that book still persists today: the debate between good new instruments and good old instruments.

Indeed, many people still believe that the only good instruments are old ones. Although it is generally acknowledged by performers that age adds an extra dimension to the sound, the instrument must have quality and sound to begin with if it is really to improve with age. In a world where many of today's great instruments date from 300 years ago, it gives us pause to recall that the so-called "Cannon" violin, made by Guarneri del Gesù, was a mere 80 years old when Paganini used it. Moreover, the brilliant virtuosi of the Baroque era, men like Vivaldi and Tartini, largely known to us as composers, were using instruments made by their contemporaries.

Whatever the outcome of the old-versus-new debate, one thing is certain: by the turn of the century, America had learned to produce violins comparable in workmanship and tone to those being made in Europe.

That tradition holds true in America today. There are now two four-year schools of violin-making, in Chicago and Salt Lake City. Across the country, one can find more than a few professional luthiers.

There are also amateur makers, perhaps as many as a thousand of them. Though they may turn out no more than one violin a year, their work is done in the precious bits of time they carve from their private lives or from their public lives as grocers, bankers and police officers.

Eagle and shield decorate an Albert violin shown at Philadelphia Centennial in 1876. Below: scroll of Prescott bass viol with brass worm-screw mechanism used by him for tightening and tuning the strings.

Lately, such people have found common cause in a new organization called the Violin Society of America, through its annual convention and concerts, its journal and, above all, its instrument competitions. At its November 1976 meeting held in Philadelphia, more than 100 violins, violas and cellos (all made within the past two years) were exhibited.

The success of such competitions is measured by the degree to which it removes some of the isolation in which violin-makers must labor. In the days of the great makers, the craftsman received constant feedback from the performer and thus was able to progress and adjust his instrument to actual playing conditions. Why? Because violins must not only sound and look good, they must be playable. A violin that sounds fine doing simple open-string tones in the workshop may be unmanageable and unresponsive to a performer playing the Brahms violin concerto. Thus, the Society feels its most important job is to encourage violin-makers and performers to talk to each other.

Another important role of the Society is to provide a forum for discussing the finer, and often magical, points of violin restoration. The world has lost its stomach for apprentice and guild systems, and probably for good reasons. But in this case, the music world—and all of us—are the losers. There are some 700 Stradivari violins in the world and about the same number of other classic instruments. Who will repair them when today's master restorers are gone?

To answer that question, the Society is concerned with the techniques of restoration to pass on to the next generation. For example, the late Paulus Pilat, an immigrant from Budapest who worked in New York and Los Angeles until 1961, once reportedly astounded a client by dunking his priceless Strad in his bathtub overnight, the better to get inside to fix cracks. He figured the water would evaporate without harming the wood, and he was right. Likewise, Paganini was seen by his biographer to undergo an anxiety attack as Vuillaume, his personal restorer, slowly operated on his Guarneri violin.

Other restorers know the trick of adding garlic to bone glue to improve its adhesion. The garlic cloves, in a sewn muslin bag, are placed in a hot glue pot for several days until all their juice has been extracted. The resulting mild odor stays with the instrument and is as much a part of its allure as the glow of its varnish or the sensuous feel of its gently undulating curves.

Mankind has had a great love affair with violins since the beginning—and over the years has acted much as any lover would, even to the extent of going to jail. Man has even personified his violin, giving it a neck, a head, a belly and a voice, in addition to its tactile delight and the salmon fluorescence of its finish. But above all, it is its voice that counts. As 17th-century English poet John Dryden noted:

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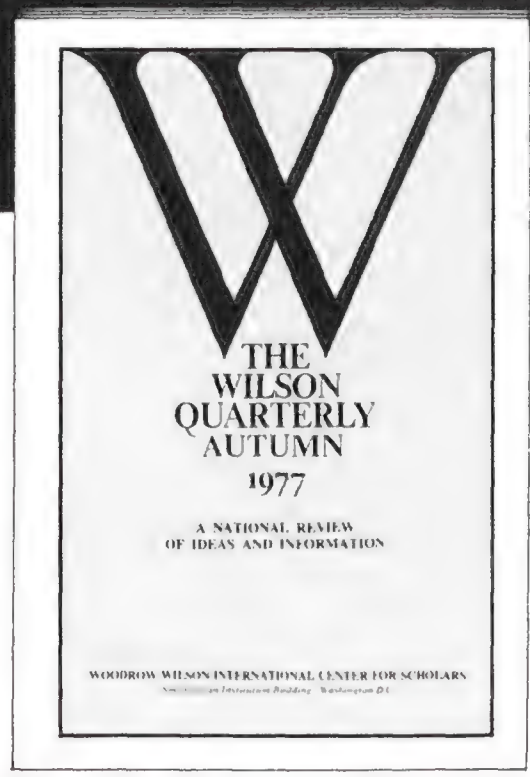

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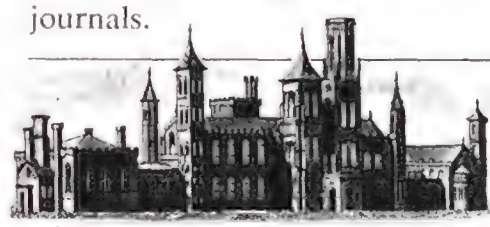

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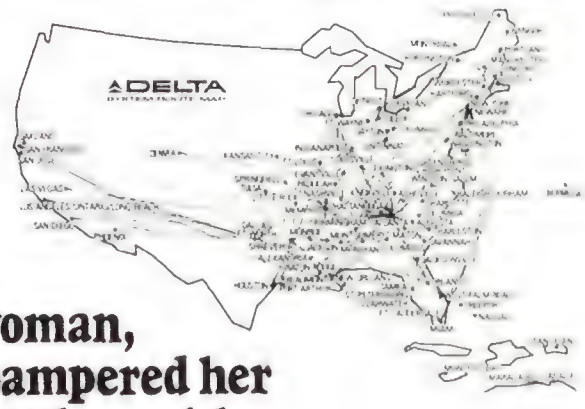

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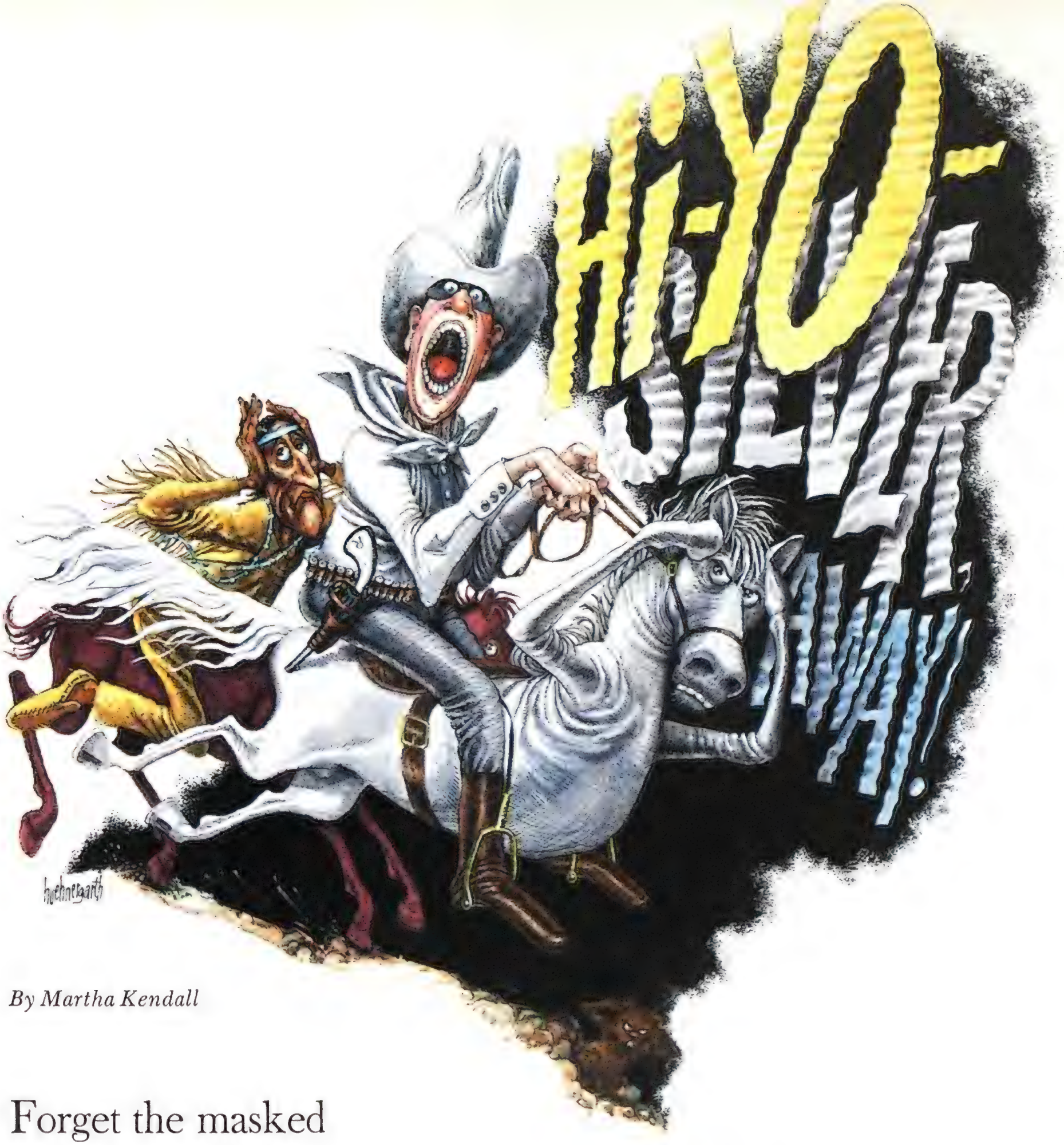

By Martha Kendall

Forget the masked man. Who was his Indian companion?

And what does Kemo Sabe mean? *Here is some deservingly serious research on a worthwhile subject*

As a child, I was a Lone Ranger *aficionada*. Weekday afternoons at 4:30 the "daring and resourceful masked rider of the Plains" and his faithful Indian companion rode into my life on the family's small-screen television set. As they rode away half an hour later, some minor character from that day's episode inevitably turned to a more knowledgeable other and asked, "Who *was* that masked man?" We in the audience, of course, already knew.

But who was that *Indian?* Twenty years had passed and I had earned a PhD in anthropology, with a specialty in American Indian languages, before I realized that Tonto's identity is as enigmatic as the Ranger's. His tribal origin is unknown. He comes from nowhere. He has no Indian friends; he has a horse named Scout. The only clue to his past

Martha Kendall is a member of the anthropology department at Vassar.

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is a single phrase from an unidentified language: *kemo sabe,* and no one actually knows what it means.

Most of my contemporaries seem to think it means "white man" or "friend," but they hazard such guesses on the basis of narrative context more than anything else. A few people suggest that it might be a corruption of Spanish *quien lo sabe?,* "who knows?," or better yet, *el que lo sabe,* "he who knows," "the one who knows." Those who offer this hypothesis bolster it by arguing that *tonto* itself is a perfectly good Spanish word meaning "stupid" or "crazy," and by noting that the Lone Ranger stories are set in just those states where one might expect Indians and lawmen to have some minimal knowledge of Spanish.

While this theory is plausible linguistically, it creates a curious impression of the relationship between our two heroes: one habitually calls the other "he who knows" and is addressed as "stupid" in return. If we accept a Spanish etymology for *kemo sabe,* then the Lone Ranger becomes a racist and Tonto a red-skinned Stepin Fetchit.

It is more logical to assume that *kemo sabe* is an American Indian term; but to claim this is to broaden the field of possibilities, not to narrow it. When white men reached the New World, there were 220-odd mutually unintelligible languages native to America north of the Rio Grande alone—quite a linguistic haystack in which to search for etymological needles. Still, the puzzle intrigued me, so I set out to discover what I could of the mysterious greeting.

A comic strip with yet another version of Tonto's greeting began in 1938.

Before Tonto appeared on the scene, the hero talked only to his horse.

I reread 10 of the 12 Lone Ranger dime novels that appeared in the 1930s and '40s, looking for clues to Tonto's tribal group. As far as I could tell, he is never specifically identified with any particular Indian nation, though he seems able to converse in several dialects.

From his name and from the setting of the Lone Ranger tales, I first assumed he was a Western Apache, probably a Tonto Apache, but this notion evaporated in the face of counterevidence contained in *The Lone Ranger and the Renegade Savage* (1946). In this adventure the Lone Ranger and Tonto are charged with pacifying the famous Chiricahua Apache chief Geronimo. I was chagrined to learn in the course of reading this story that Tonto could neither converse with nor understand Geronimo, demonstrating conclusively that he could never have been a Western Apache. Western Apaches speak a variant of Apache recognizably distinct from that of the Chiricahuas; nevertheless, the two dialects are similar enough linguistically to be mutually intelligible.

Frustrated with this line of pursuit, I tried writing letters to Clayton Moore and Jay Silverheels, who played the Lone Ranger and Tonto respectively in the television serial. I never expected replies from either of them, reasoning that they were heartily sick of being queried about the term *kemo sabe*. My expectations were entirely accurate.

I had more success with the Popular Culture Center at Bowling Green University in Ohio. They responded that *kemo sabe* is discussed in Jim Harmon's

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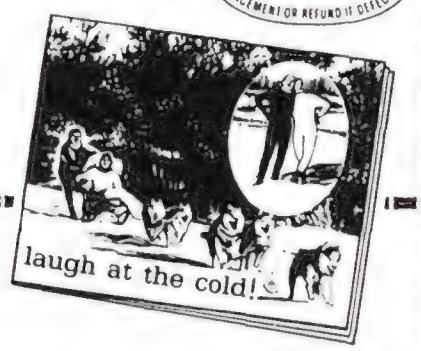

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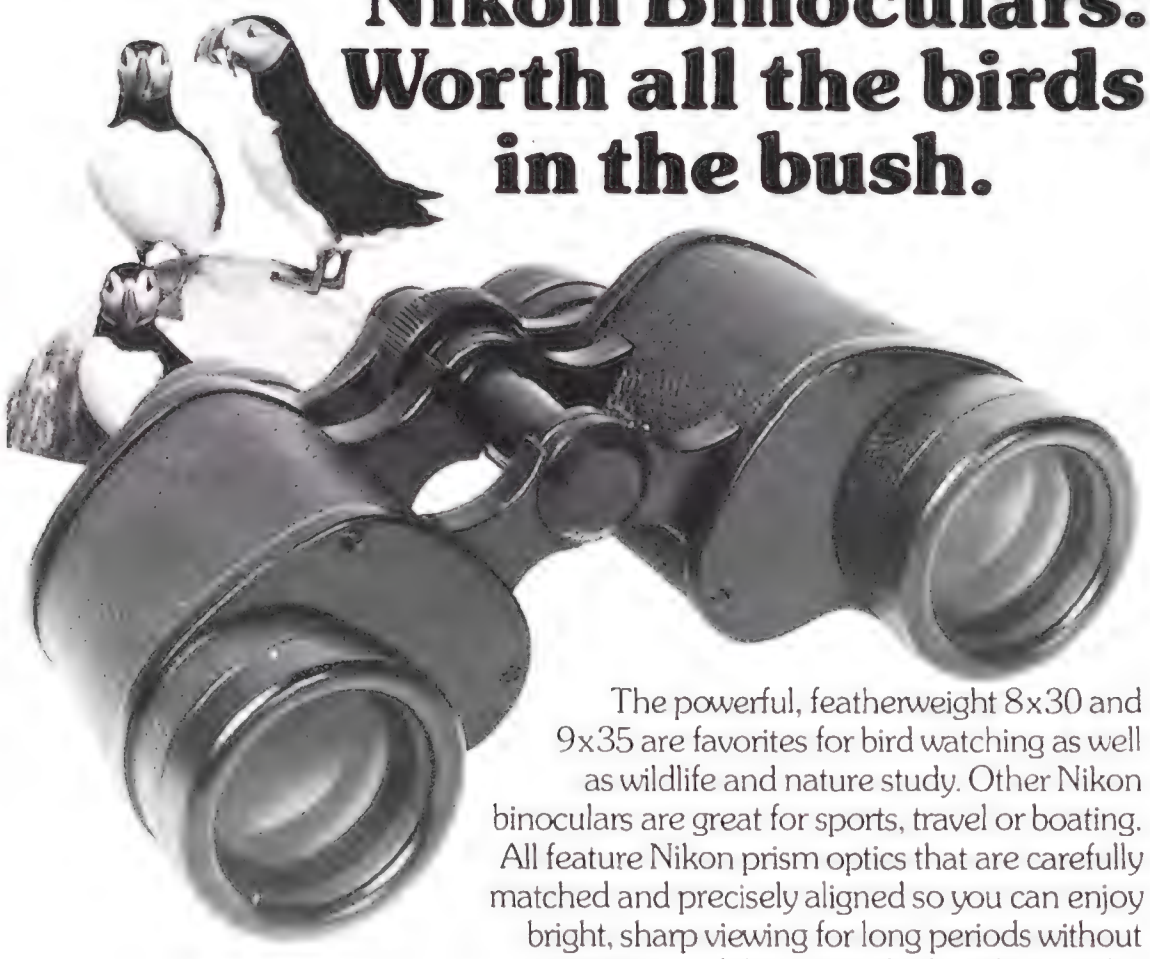

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book *The Great Radio Heroes* (Doubleday, 1967), where it is translated "faithful friend" or "trusty scout." I eagerly read Harmon's chapter on the Lone Ranger and Tonto, only to find that the Indian's nationality is as much a mystery to Harmon as to myself. All he says of Tonto's background, really, is that his dialect is "unique."

In the meantime, I located an article entitled "Hi-Yo, Silver" by J. Bryan III, in the *Saturday Evening Post* for October 14, 1939. It contained the startling information that Tonto is supposed to be, theoretically at least, a Potawatomi. I wondered what an Indian from the Great Lakes Region would be doing in the American Southwest and how he would have gotten to know the deserts so well if he had grown up in Michigan with his tribe, but in fiction anything is possible.

I learned from Bryan's piece that Tonto's creator, Francis Striker, hailed from Buffalo, New York, and had never been west of that city until he was brought to Detroit to write the famous *Lone Ranger* serial for radio station WXYZ in 1932. He had written several successful radio shows before that, one of which featured a "semi-savage" named Gobo. Apparently, Gobo was metamorphosed into Tonto because the Lone Ranger needed a companion. The poor lawman had appeared alone in nine radio episodes, talking only to himself or to his horse—a practice that necessarily limited opportun-

Based on Spanish, the Ranger was "He Who Knows," the Indian "Stupid.

Striker, looking for a simple but an authentic Indian phrase, may have found it in paper on the Tewas.

ities for dramatic scripting. ("They're all around us, boy!" "Whinney.")

As to the mystery of *kemo sabe,* Bryan noted that Striker's letters to children always began, "Ta-i ke-mo sah-bee" ("Greetings, trusty scout"). In other words, Striker made it up. "Ta-i ke-mo sah-bee" is as similar to Potawatomi as "hiya, pal" is to Chinese.

Just to tuck in the loose ends, I asked Ives Goddard of the Smithsonian Institution if *kemo sabe* could possibly be from Potawatomi or from a language related to it, since he specializes in that language group. (We were standing around at a conference on American Indian languages in San Francisco.) He said he had heard that theory too, but no, the phrase definitely was not Algonquian in origin. I was about to tell him all about Gobo, when he added "It's Tewa."

I couldn't believe my ears. After months of letter-writing and novel-reading, after hours of watching *Lone Ranger* reruns and phoning local television stations to query them about Tonto, I found not only someone else who cared about *kemo sabe,* but could identify the language it is from. As it turned out, Dr. Goddard and I were not alone. Four or five other serious scholars were interested in the problem, even if only half-seriously. Two provided plausible American Indian sources for the phrase.

Goddard had discovered that in J. P.

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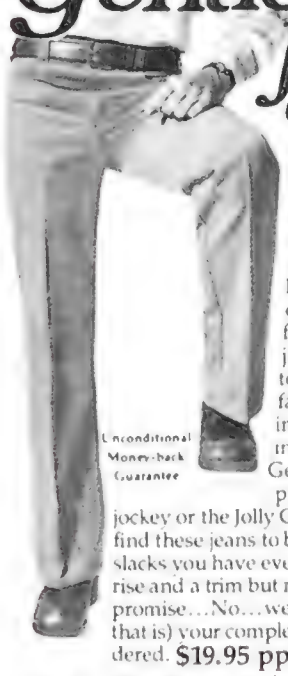

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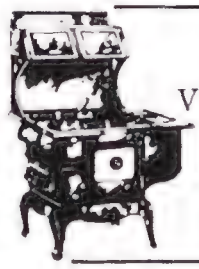

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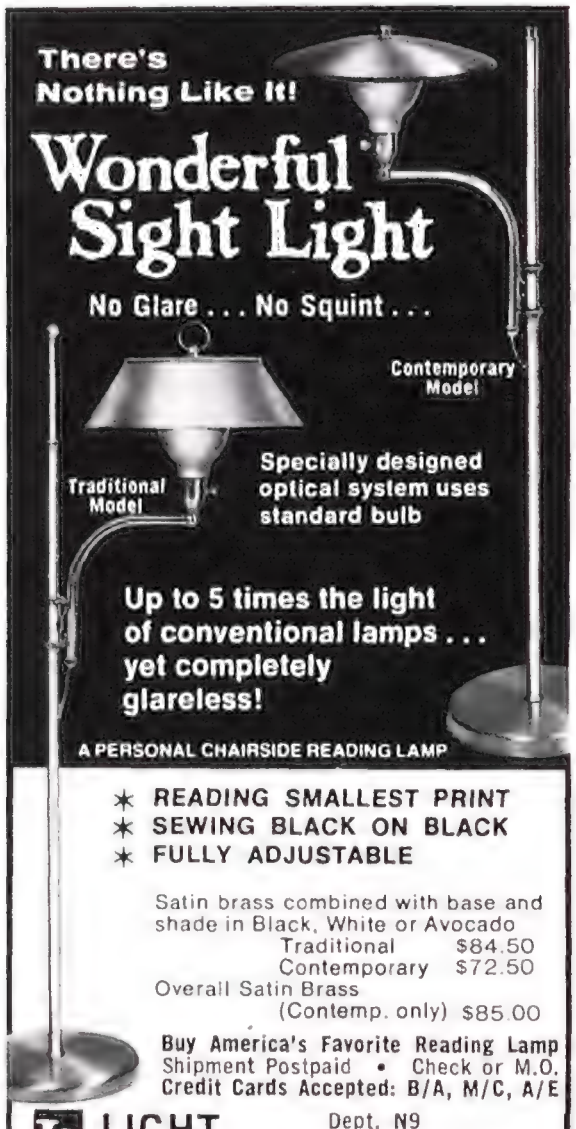
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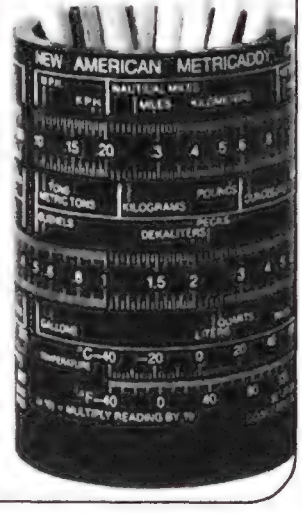

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Harrington's "The Ethnogeography of the Tewa Indians," which appeared in 1916 in the *29th Annual Report of the Bureau of American Ethnology*, a Smithsonian Institution publication, a list of Tewa words for other tribes and peoples includes these items:

> "APACHE. *Sabe* of obscure etymology. This is applied to every kind of Apache or Athapascan, including the Navaho. See Chiricahua Apache, Coyotero Apache, Jicarilla Apache, Llanero Apache" . . . . (p. 573).
>
> "FRIEND. *Kema* 'friend'." (p. 574).

Just above the entry for FRIEND is one reading:

> "COYOTERO APACHE. *Kojoteru, Kojoterusabe (Kojoteru* Span. Coyotero; *Sabe* 'Apache')."

It seems incredible, but the words *kema* and *sabe* actually do appear in juxtaposed entries in Harrington's work.

Striker, then, may have wanted some authentic American Indian words for Tonto to speak and consequently searched for a book containing native American words short and simple enough for a children's program. Assuming that Striker had wanted Tonto to be a Southwestern Indian, since the masked man was a Texas Ranger, he might have been attracted to a book on the Tewa, who live along the Rio Grande in New Mexico (with one small ethnic outpost among the Hopi in Arizona). While Harrington's monograph on Tewa ethnogeography is a bit arcane for a radio script writer, it is not completely implausible that Striker might have come across it. In the early part of this century there was a veritable glut of these Smithsonian volumes in used-book shops, since they were distributed free to various politicians who clearly had no use for them.

If we assume that Striker or his research assistant found *kema* and *sabe,* scribbled them down hurriedly, and redefined *sabe* somewhat, we have a reasonable explanation of the change in spelling (*kema* becomes *kemo*) as well as the slippage in meaning ("Apache" becomes "Faithful"), and we have a bona fide American Indian origin for Tonto's famous phrase.

When I told Alan Shaterian of the University of California at Berkeley about the Tewa hypothesis, he supplied one of his own. His is from Yavapai, an American Indian language spoken in

Tonto surely wasn't a Western Apache: he couldn't talk with Geronimo.

Arizona, and one that I have actually worked on myself. The "Yavapai theory" goes something like this:

Striker, knowing nothing about Southwestern Indians, wants to lend an air of authenticity to his characterization of the Lone Ranger and his Indian companion. Rather than hunt around musty old book shops, he goes to Arizona to do some research and lands on an Apache reservation. This particular reservation is the home of the Tontos, so Striker incorrectly assumes that every Indian here is a Tonto. Actually, the Tonto Apache have been associated with the Northern Yavapai for as long as anyone can remember, and have intermarried with them fairly steadily since the turn of the century when they were interned together at San Carlos, Arizona.

Now, argues Shaterian, suppose Striker approaches a Yavapai, incorrectly assuming he is a Tonto and asks the Indian word for "one who is white" or shows the Indian a picture of the Lone Ranger in his white shirt and trousers and asks him to make up a name for this person in his language.

To the first question (how do you say "the one who is white?") a typical Yavapai would respond *kinmasaba*. Faced with the instruction to think up a term of address for someone who habitually dresses in white clothes, a good Yavapai response might be *kinmasabeh*. The difference in ending is that *-a* marks certain kinds of nouns while *-eh* is a vocative marker, used when one addresses another person directly. It might be translated "thou" or "you." *Nmasab* is the color term for white. When used alone

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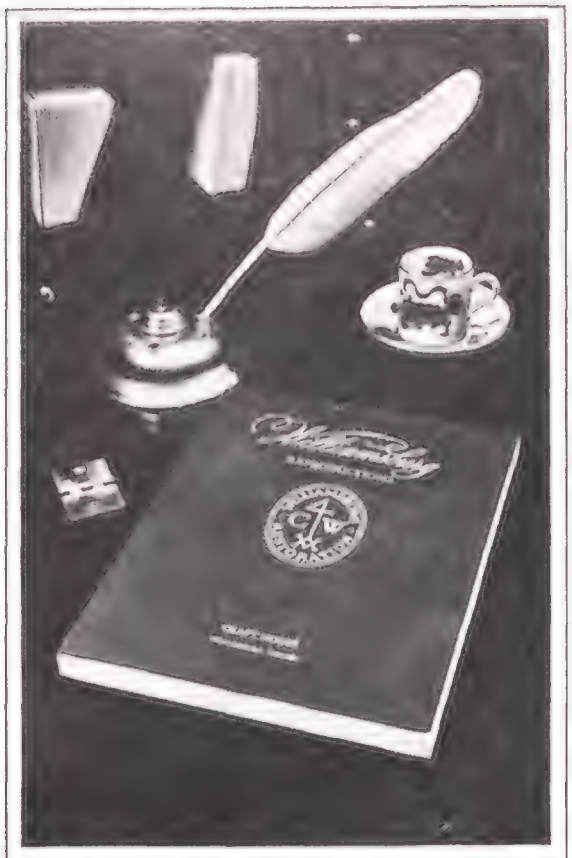

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it refers to white clothes, cloths or rags, but it never refers to the skin tone of Caucasians. The prefix *ki-* literally means *the one who,* so that the whole construction *ki-nmasab-a* means precisely "the one who is white," while the construction *kinmasab-eh* means, a little less precisely, "thou, white clothing" or, more irreverently, "hey, you, white rags." In casual speech, the Yavapais pronounce *kinmsabeh* in such a way that anyone but a trained linguist probably would hear *kimasabeh.*

If Shaterian and Goddard can play this game, so can I. Some casual flipping through American Indian dictionaries produced these possibilities. CREE: "kemoo'tisew," *He is secret, concealed.* SOUTHERN PAIUTE: "Qima" *stranger,* plus "sautsi" *to peep* (perhaps a reference to the Lone Ranger's peeping through a mask). OSAGE: "ke-mo-ge zhu dse," *red-breasted turtle* (admittedly, not very likely). TUNICA: "koma," *to comb one's* hair, plus either (1) "sara," *to beg or implore,* or (2) "sari," *to hate or detest* (so either the Lone Ranger loved to comb his hair or he hated it; he was fastidious or slovenly). NAVAJO: (1) "k'ineedlishii," *stink beetle* (perhaps this is what Tonto really thought of him), (2) "k'ineeshbizhii," *dumpling* (he was overweight?), or (3) "kin yaah sizini," *whore* (he was a Midnight Cowboy?).

At this point, I decided that I prefer mystery to certainty.

Does it matter, ultimately, what *kemo sabe* means? At one time, I passionately thought so. But, then, after all, Tonto and his masked friend are mythic characters, and as such, they do not have to be fixed in historical reality. They exist and continue to exist in the timeless Wild West of the mind. Hi-yo, Silver!

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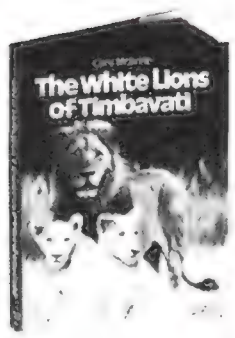

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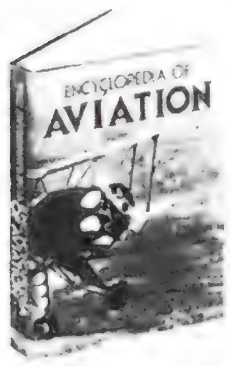

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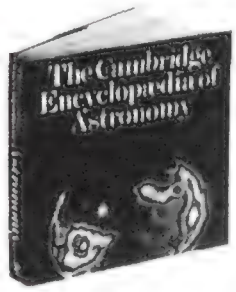

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Book reviews

A Will To Survive
Israel: The Faces of Terror 1948
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John Phillips
(The Dial Press/James Wade, $14.95)

"A great deal of this book is universal," Golda Meir tells us in her introduction to *A Will To Survive,* but John Phillips' stunning photographs could have been taken in only one place—in Jerusalem, as the Jews made their last exodus from the Holy City. Pictures of faces fraught with the fear, fatigue and confusion of war have become all too familiar in our time, but here are faces that recall the persecution of centuries, from the Biblical time when the Babylonians drove the Jews into exile, through the Nazi death camps of World War II, to May 28, 1948, when a young Haganah officer surrendered Jerusalem's Jewish Quarter to the victorious Arabs and John Phillips was there to preserve the instant with his camera.

Then a photographer for *Life,* Phillips spent 11 days recording the fall and destruction of the Quarter. He managed to get through the city wall by wearing the uniform of an Arab Legion officer,

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and he saved his pictures from Arab censors by smuggling them out of the Middle East. Twenty-seven years later he returned to photograph the survivors and the battle zone, rebuilt since the Israelis rewon the Old City in 1967. The results make up this book, and they are remarkable, telling us much about the determination and versatility that have kept Israel afloat in a hostile sea.

Here is an Israeli fighter on a stretcher on a hospital floor, his hands clasped and his face covered as though dead. When Phillips traces him a quarter of a century later, he finds the soldier is Mordechai Gazit, the Foreign Ministry luminary who was instrumental in negotiating the complex Sinai Agreement with Henry Kissinger and then became Israel's ambassador to France.

Here is an elegant, manicured matron petting her poodles in the patio of her Tel Aviv villa, the perfect socialite. But she is as tough as the stones of her patio wall. When Phillips first photographed Mrs. Masha Kaplan in 1948, she was a nurse who had been operating under fire by the light of kerosene lamps. Since then, she has helped evacuate Jews from Yemen, set up a hospital unit for premature babies and treated burned soldiers in two more wars. Her doctor husband is a pioneer in the delicate art of laser beam surgery.

Here is a retired couple strolling past the sun-seared wall of the school where they once taught. When Phillips first caught the woman in his lens during the capitulation of Jerusalem, she was an underground veteran who had been making bombs from cigarette tins.

Here is a construction crane rising above the honey-colored limestone of a building project going up. In spectacular contrast, Phillips' shot of the same site in wartime shows clouds of smoke and the walls of a synagogue collapsing in a cascade of rubble.

Although Phillips professes "a lifelong sympathy for minorities," it is a selective one: he evidently has little use for the currently fashionable support of Palestinian Arab claims on Jerusalem. There is nothing here to back up Palestinian allegations of Israeli outrages, nothing to dispute Israel's annexation of the Old City. He writes instead of wanton destruction by the Arabs in 1948, of looting and arson, and of Israeli reconstruction

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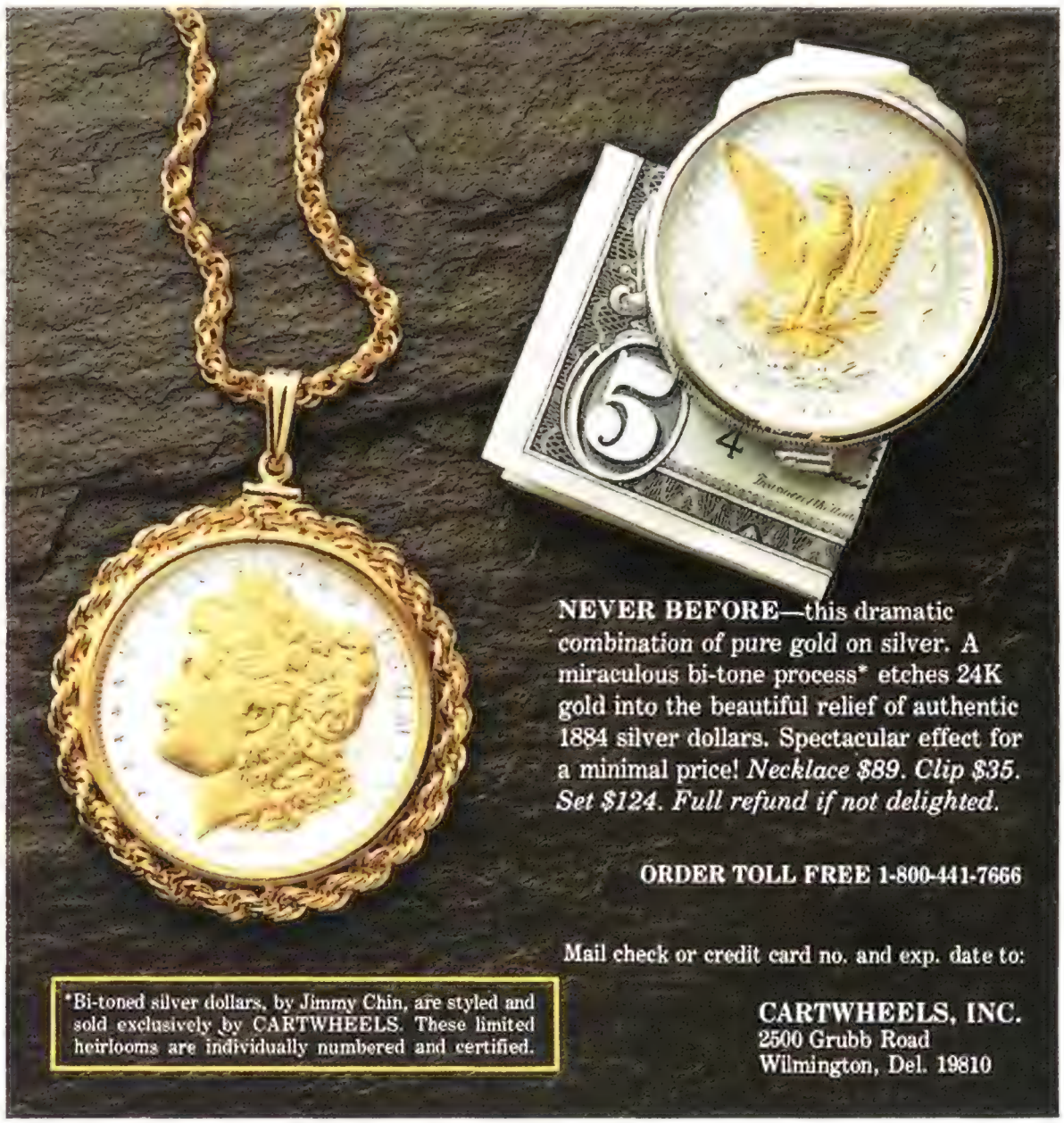
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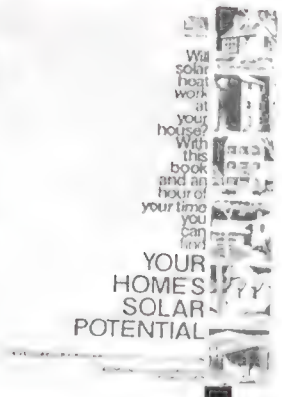

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since 1967 (albeit with some forced eviction of Arab residents). His pictures—some of them never before published—are ample testimony of his views.

And his condensed history of Middle East hostilities will be frustrating for advocates of the Arab side or for those who maintain that the Palestinians are moderates. At one point he quotes a woman in Damascus exulting that "I can't wait to drink blood from the skulls of Jews I'm going to kill in Palestine!" Yet some of his pages suggest that the hatred is more extreme today than it was when Israel was born in 1948: one striking photo shows an Arab legionnaire holding hands with the captive leader of the Jewish community.

For Israelis, as Golda Meir says, *A Will To Survive* may be "a story with a happy ending." But the story is far from ended. Perhaps the finale will come, in the words of one of Phillips' subjects, " . . . after the Arabs realize that Israel is here to stay. . . . When they slowly wake up to the fact, they may well say, 'Let's make the best of it and get together.'"

—*David Lancashire*
The Globe and Mail, Toronto
Former Associated Press correspondent
in the Middle East

Birds of the Antarctic and Sub-Antarctic
George E. Watson
(American Geophysical Union, $15)

In a schematic view of our terrestrial globe, the land masses that preponderate in the northern hemisphere trail off, beyond the equator, into the waters of the one great ocean that envelops the southern hemisphere. Beyond this ocean lies Antarctica, a virtually uninhabitable continent so remote that a traveler who takes ship across the ocean to visit it feels, upon his arrival, as if he had crossed outer space to reach another planet.

The "outer space" itself, however, so far from being uninhabitable, teems with strange seabirds, large and small. Antarctic and sub-Antarctic birds that we in our land hemisphere may never have heard of occur in unequaled abundance. Thus the five almost indistinguishable species of prions, which carpet the waves over vast areas, may make the prion genus the most populous on Earth.

The best regional manual on birds that I know has now been published, and it is on this, the most inaccessible of avifauna. *Birds of the Antarctic and Sub-Antarctic,* by the curator of birds for the Smithsonian Institution's National Museum of Natural History, although it contains 350 pages, slips easily into the pocket. It provides the essential material of a field guide to identification, including excellent colorplates or drawings by Bob Hines of all the birds discussed. But it also provides, species by species, accounts of behavior, food habits, reproduction, molt, predation and mortality, even ectoparasites. And for each regularly occurring species, there is a map showing its distribution and the known sites of its nesting. There are also sections on the various environments, on climate, on the techniques of identification at sea, on collecting, on banding and on a variety of other matters.

This book, moreover, was subjected to testing in the field before being made final. I am only one of those who carried a preliminary draft on a visit to the Antarctic years ago, having been asked to note, on the basis of observation, any emendations to be made. If there are, in the field of ornithology, hasty productions for the market, this is not one.

No one who has an eye for birds should go to the Antarctic, or deep into the southern oceans at all, without studying this book in advance and then pocketing it. It would also serve to enlarge the mental world of those who have no expectation of ever visiting the regions with which it deals. Immanuel Kant knew the world without ever leaving his native city of Königsberg, and there is no reason why any of us should not become familiar with remote regions simply by our reading. Indeed, one who had never read anything, although he visited the Antarctic, would know it less well than one who read extensively but never visited it. This makes it appropriate to observe that Dr. Watson's book is readable. It is written in straight English, technical jargon being kept in its place.

I end this review with a plea. W. B. Alexander's *Birds of the Ocean,* still the only handbook of all the world's seabirds, was first published in 1928. The Smithsonian Institution has got out three regional manuals on the identification of seabirds, the one on the tropical Atlan-

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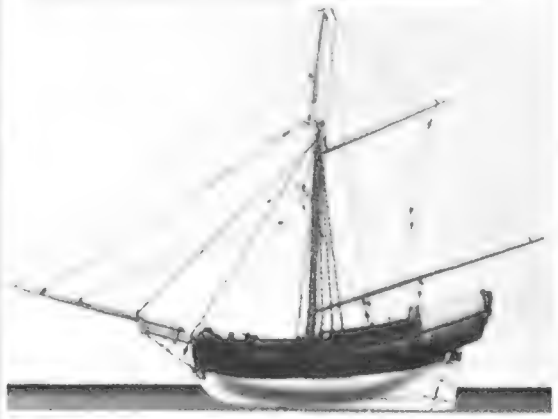

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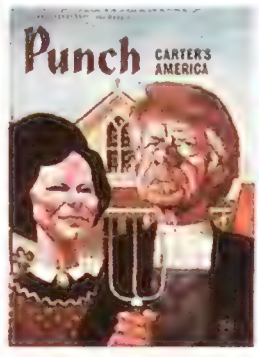

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tic by Dr. Watson himself. Surely he could perform no greater public service, now, than to produce a book on the world's seabirds that was basically modeled on the splendid work under review.
—*Louis J. Halle*
Author, *The Sea & the Ice: A Naturalist in Antarctica* and other works

The Living Heart
Michael DeBakey, M.D., and Antonio Gotto, M.D.
(David McKay, $14.95)

"The heart," as more than one observer has noted offhandedly, "is really just a pump." Yes, and William Shakespeare was just a writer. Consider, for example, that this pump, the heart, is called upon to operate for (one hopes) 70 years without once being allowed to rest or to shut down for extensive repairs. That its valves of delicate flesh will open and close, with considerable hydraulic pressure, 2.5 billion times during those 70 years. (That, by way of contrast, replacement prosthetic valves of silicone and steel are often battered into uselessness within four years.) That the pump moves through the body between six quarts of blood each minute (when a person is resting) and as many as 36 quarts a minute (when, say, a football player is engaged in "fright and flight"—a punt return). That even the most superbly conditioned athlete will sink in exhaustion, virtually every other part of the body immobile, while the heart goes about its job.

Yet the heart can fail. In fact, heart disease of one form or another is the leading cause of death in the United States, taking one million lives each year.

The human heart is one part, the center, of the cardiovascular system. The latter part, the vascular system, consists of the blood vessels that make up the circulatory system. It is in the vascular system that most serious heart diseases, except for congenital abnormalities such as a defective valve or a hole in a chamber, originate.

The past two decades have seen more significant gains in the treatment and prevention of heart disease than in all previous medical history. Some gains are the result of mechanical devices: the heart-lung machine, which revolutionized cardiovascular surgery, and the

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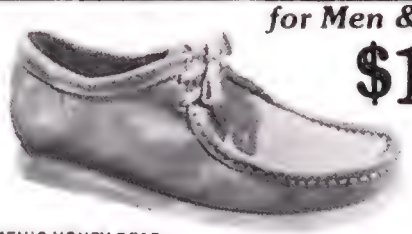

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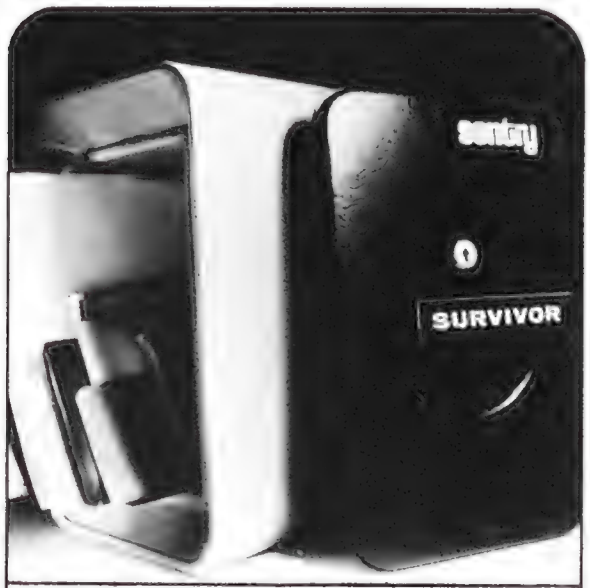

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The Living Heart, which Dr. DeBakey wrote with Dr. Antonio Gotto, a colleague at the Baylor College of Medicine in Houston, should remain for some time the premier work for the general reader on the cardiovascular system. Obviously authoritative, the book is also thorough, honest, and—thanks to a jargon-free text complemented by 121 illustrations and a 14-page glossary—lucid. As a member of the open-heart club, I can testify to the accuracy of those terms—and the usefulness of this book. It is better by far as an informational source than a visit to a doctor (and less expensive as well). Doctors DeBakey and Gotto explain what the cardiovascular system is, describe how it works, disclose how it fails, and suggest what can be done to prevent its failure. In short, what they do is expound upon the "what" of heart disease. What remains to be isolated of course is the "why." But with resolute people like DeBakey and Gotto searching, that too will undoubtedly be discovered.

—John F. Warner
Boston-based writer and editor

Handbook of Unusual Natural Phenomena
William R. Corliss, editor
(The Sourcebook Project, Glen Arm, Maryland 21057, $14.95)

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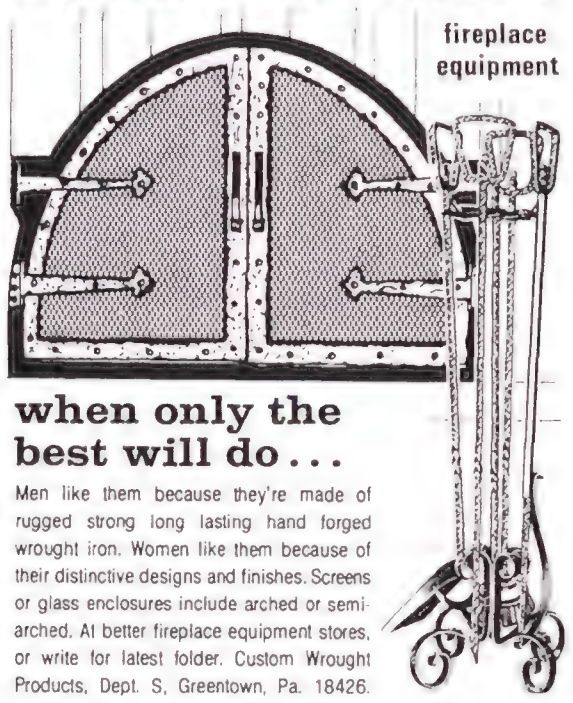

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the face of a glacier near Mt. Fairweather. The mirage was seen each year between June 21 and July 10. Predominant in the view was an exact replica of the tower of St. Mary Redcliff and a ship's mast. How could this happen? Probably because the Earth's atmosphere was acting as an enormous fixed lens focused on the English coast—4,422 air miles distant via the polar route.

At least, that is how we would explain the view if we were to rely solely on today's knowledge of optics. On the other hand, why rely only on what we know today? Let's speculate. The Earth and the heavens are constantly putting on cosmic *son et lumière* shows for our benefit. It is quite possible that this prestidigitation holds the key to the vulnerable soft edges of our rational and measured sciences.

As a way of poking into those soft spots, William Corliss founded the Sourcebook Project to publish his collection of the oddments of Nature as noted in learned and scientific journals. For this, the eighth in a series of books on scientific anomalies, he ranged through the complete files of *Nature* (265 volumes) and *Science* (195 volumes), as well as *Meteorological Magazine, Monthly Weather Review, Marine Observer* and about 70 other periodicals. There is no occult here. No UFOs. No Bermuda Triangle. No devils. No loonies. Just dependable, eyewitness accounts. Like this letter to the *Zoologist* (1859):

"I was out insect-catching by the side of the river Waveney, when a thunderstorm came on. I ran for shelter to the buildings at Aldeby Hall. The rain came down in torrents. Just before I was clear of the fens I observed some small toads on my arms, and several fell into my net, and on the ground and in the paths there were thousands. I am quite sure there were none in my net before I started, as I took a *Leucania pudorina* out of it. I believe they fell with the rain out of the clouds. Can you enlighten me. . . ?"

Although it's probably too late to prevent our Waveney River toadster from going round the bend, this book presents numerous similar incidents. In 1896 frozen fish rained on Essen, Germany. An eight-inch gopher turtle fell on Vicksburg, Mississippi, encased in a huge hailstone. Another hailstone, the size of an elephant, was reported in Seringapatam, India; it took three days to melt. People aboard the S.S. *Nagoya*, en route from

London to Calcutta, on October 22, 1927, saw evenly spaced bands of radiating cirrus clouds; they gave an enclosed-dome appearance to the sky, as if the Earth were being fitted for its meridian lines. Second suns have been sighted (1957), as have peculiar arcs of color at night (1955). Other observers have seen pale blue, chartreuse, and magenta concentric rings around the point on the horizon where the sun went down (1964).

Equally compelling are the dull, explosive thuds, called mistpouffers, as heard off the coast of Europe, or the so-called Barisal Guns, off the Ganges Delta, that attracted much attention in the 1890s. The Peruvian desert has been heard humming (1931); thunder (1906) and snow (1915) have made joyful, musical sounds. When lightning hits a hayrick, it leaves a tube of hardened silica in the center of the hay, along its path to the ground (1831, 1934). The villages of Thames Ditton, Surrey (1867) and Reichenberg, Austria (1873), were showered with fearful enfilades of sulfurous fire.

These are indeed signs and wonders—of the kind that poets and conjurers usually are charged with reporting. For example, *pwdre ser* is the Celtic term for the penchant of meteors to turn into quivering, gelatinous masses wherever they hit the ground. Sir John Suckling, the Cavalier poet, was in touch with this phenomenon as early as 1641:

As he whose quicker eye doth trace
A false star shot to a mark't place
Do's run apace,
And, thinking it to catch,
A jelly up do snatch. . . .

—Michael Olmert
Writer and critic

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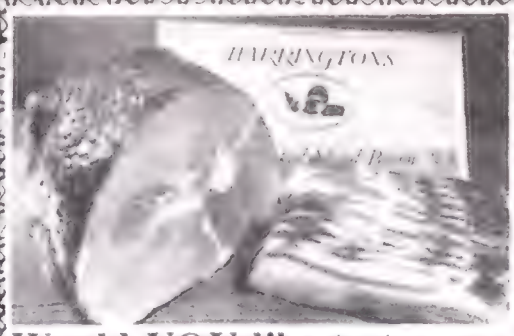

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Additional reading

Biosphere (p. 38)

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This Island Earth, edited by Oran W. Nicks, NASA, 1970

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"The vice president's residence: Eagles, Hopper and Ernst" by Sara Booth Conroy, *Art News,* November 1975

Matisse cut-papers (p. 72)

Henri Matisse Paper Cut-Outs by Jack

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Cowart, Jack D. Flam, Dominique Fourcade, and John Hallmark Neff, The St. Louis Art Museum and The Detroit Institute of Arts, distributed by Harry N. Abrams, Inc., 1977

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The World Encyclopedia of Comics edited by Maurice Horn, Chelsea House Publishers, 1976

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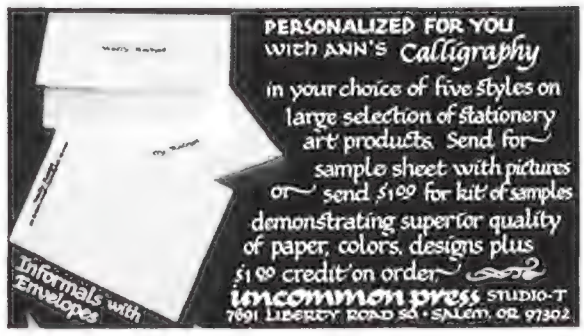
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You'll also see a part of the Book of the Dead, buried with pharaohs to help their spirits come back out of the tomb after interment. You'll see mummy wrappings bearing painted pictures of the people inside—the pictures unbelievably modern and realistic though close to 2000 years old. You'll see delightful wooden models, unearthed from a long-lost secret chamber, of everyday Egyptian life in the Eleventh Dynasty. You'll see pyramids, statues, marvelous temples, and more.

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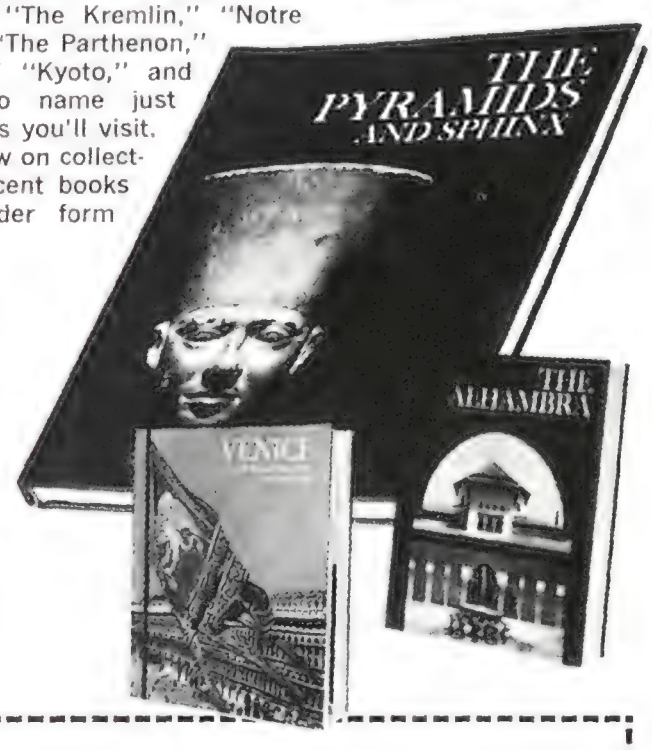

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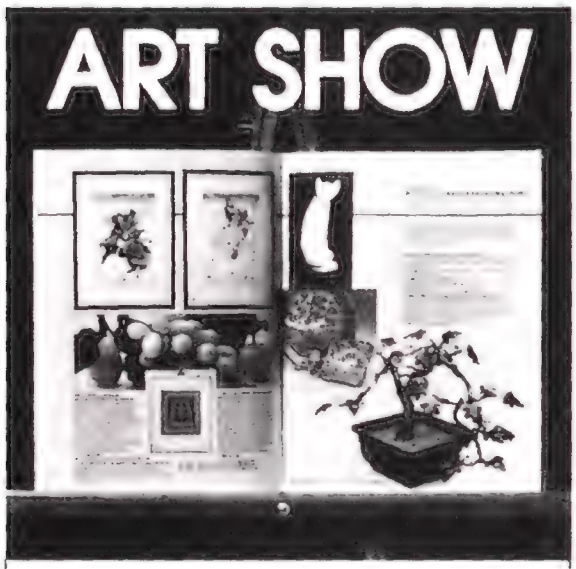

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Note: The film *To Fly* is shown daily at 45-minute intervals beginning at 10:30 A.M. in the theater, and the planetary show "Cosmic Awakening" is shown daily at 45-minute intervals in the Spacearium beginning at 12:45 P.M. on weekdays and 10:30 A.M. on weekends.

Museum of Natural History
"Living Things: Excerpts from a Sketchbook Diary" (African scenes) by Olemara Peters will open September 21 and continue through November 10.

Freer Gallery of Art
"Nature in Japanese Art" will feature animals, birds and plants in Japanese paintings, ceramics, lacquered objects and metalwork. The show will open in late September.

National Collection of Fine Arts
"Raphael Soyer: Drawings and Watercolors" will open on September 30 and continue through November 27.

Cooper-Hewitt Museum
"The Cooper-Hewitt Collections" presents a major exhibition of objects from the Museum's holdings. Facets of the show will include surface embellishment, the influence of patrons and clients on design, sources of design, and fantastic and fanciful items. Opening September 27.

An exhibition of drawings, models and photographs will show how architects and designers develop their ideas. "Drawing toward a More Modern Architecture" will open on September 20 and close November 6.

Arts and Industries
The "1876" exhibition installed in the Arts and Industries building, which recaptures the Centennial Celebration in Philadelphia 101 years ago, will receive some additions. Britain's display will expand to include the crafts and fashions of the Colonies.

Note: The 30-minute film *Celebrating a Century* can be viewed at 11:30 A.M. and 2 P.M. daily in the small theater to the left of the entrance.

Museum of History and Technology
In addition to several major continuing shows—"We The People," "Nation of Nations" and "Photographing the Frontier"—visitors to the Museum of History and Technology may enjoy a noontime music series in Carmichael Auditorium. The Commodores, the U.S. Navy Jazz band, will play from noon to 1 P.M. Fridays and Mondays throughout September, beginning September 9.

Division of Performing Arts and Musical Instruments
The 1977 season will begin with two concerts in the United States Air Force's Airmen of Note guest artist series:

- September 22, Harvey Phillips and Rich Madison, Tuba Jazz Consortium, will perform.
- September 29, Phil Wilson (trombonist) joins the Airmen.

Both performances at 8 P.M. There will be free open rehearsals, 4-6 P.M., before each concert.

- Benny Carter will play alto saxophone and trumpet to open the Jazz Heritage series on October 2. A free workshop at 4:30 P.M. precedes the 8 P.M. concert. On October 6, blues singer Jimmy Witherspoon will continue with the Airmen of Note series at 8 P.M., following an open rehearsal from 4-6 P.M.

All performances in Baird Auditorium, Museum of Natural History.

Festival of American Folklife

The 11th annual festival, to be held October 5 to 10, will continue to present music, dance, crafts and food—all of which have been so popular throughout its history. The events, all free, will take place around the Museum of History and Technology, the Museum of Natural History and in the Renwick Gallery.

A special "Folk Power" exhibit will show how energy is used in the production and preparation of food. It will include a farm wagon, hauled by a steam engine, a coal-fired, steam-driven thresher, open-hearth cooking, brick-oven baking and possibly a solar oven. Menus in the museum cafeteria at History and Technology will reflect the culinary influences of Italian, Greek and Jewish heritage on American cooking.

This year, crafts from Virginia will be featured, as well as some which have been added to the American heritage by craftsmen from other nations.

Music will include songs by native Americans from tribal groups, gospel singing and instrumentalists on dulcimer, fiddle and banjo.

The African Diaspora program will continue to spotlight black American, African, Caribbean and Latin American cultures. The theme will be "Street Culture," and include music, dancing, costume and food.

The Family Folklife and Oral History program will continue to collect stories from museum visitors to add to its bank of family folk traditions. Workshops will be offered this year for the first time on making collections of family lore.

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- Tucson, Arizona—"Folk Baroque in Mexico: Mestizo Architecture through the Centuries," Arizona State Museum, September 30-October 29.
- Costa Mesa, California—"Edwin Janss jr., Underwater Photography," Orange Coast College Library, September 24-October 23.
- Boulder, Colorado—"Space Art from the USSR," Fiske Planetarium, through September 18.

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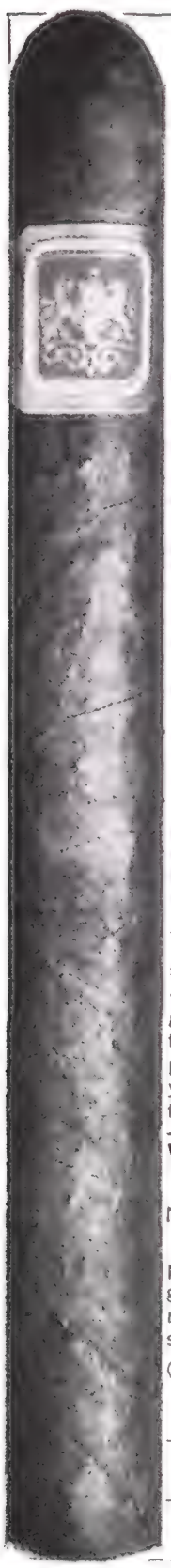

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- New Haven, Connecticut—"Folk Art and Crafts: The Deep South," Yale University Art Gallery, opens September 10.
- De Kalb, Illinois—"Antarctica," Davis Hall, Northern Illinois University, September 9-October 8.
- Chicago, Illinois—"Psi Search" examines parapsychological research, Mundelein College, September 10-October 9.
- Iowa City, Iowa—"Antwerp Drawings and Prints from the 16th and 17th centuries," University of Iowa Museum of Art, September 10-October 16.
- Baltimore, Maryland—"Naive Art in Yugoslavia," Towson University Art Gallery, September 9-October 9.
- Boston, Massachusetts—"Australia: The Fourth Part of the World," Boston Museum of Science, opens September 16.
- Worcester, Massachusetts — "Bridges: The Spans of North America," Gordon Library, Worcester Polytechnic Institute, September 9-October 8.
- St. Louis, Missouri—"Tropical Blossoms," Museum of Science and Natural History, September 3-October 1.
- Rome, New York—"New Glory, Part I, Colonial and Revolutionary Era Flags," Rome Art and Community Center, September 3-October 1.
- The Black Presence in the Era of the American Revolution, 1770-1800," will be appearing at the New York Public Library in New York City from September 24 through October 23, and at the Rome Art and Community Center in Rome, New York, from September 24 through October 23.
- Chapel Hill, North Carolina—"Hungarian Art Nouveau," University of North Carolina Art Center, September 24-October 30.
- Philadelphia, Pennsylvania — "Terminal, Station and Depot," University of Pennsylvania Fine Arts Building, September 10-October 9.
- Washington, Texas—"And the Band Played On" offers an overview of American band history, Star of the Republic Museum, September 17-October 16.
- Vancouver, British Columbia—"There's a Sound in the Sea," Vancouver Public Aquarium, September 24-October 23.
- "American Agriculture: A Continuing Revolution," will be seen in Dallas, Texas, at the Northeast Texas Library, September 17, 1977-March 12, 1978; also in Pleasanton, California, at the Alameda County Fairgrounds, from September 17 through October 16.

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Associates Reception in Washington
Upon arrival at the Smithsonian, members are invited to register in the Associates Lounge in the Smithsonian castle on the Mall. Here, from 10 A.M. to 4 P.M. daily, a special orientation and printed materials are available.

Associates planning trips to the Smithsonian may send a postcard or call for an information packet: Associates Reception Center, Smithsonian Institution, Washington D.C. 20560; call (202) 381-6264.

If you have misplaced your membership card, the Associate receptionist in the castle will issue a replacement upon presentation of your SMITHSONIAN magazine address label. Membership cards are required for luncheon in the Court and discounts in the museum shops.

The Court
Through Labor Day, September 5, members can enjoy breakfast, lunch and dinner daily in the members' dining room, The Court, located in the Museum of Natural History.

A hearty breakfast is served 8:30-10 A.M. daily, with early morning admittance by Associate membership card via Constitution Avenue entrance only. Cost for adults, $2.95; children, $1.95. Luncheon is served 11 A.M.-3 P.M.; dinner 4:30-7 P.M. Cost for adults, $3.95; children $2.95. After Labor Day, when museums and galleries close at 5:30 P.M., dinner will be discontinued.

Parking for Visitors
Street parking near the Smithsonian complex is difficult. Use of public transportation is recommended. The Air and Space garage, 7th Street and Independence Avenue, S.W., is open weekdays from 7 A.M. and weekends from 9 A.M. until one hour after museum closing.

The Smithsonian station of the Metro subway system links the Maryland and Virginia suburbs with the museum complex, as does the more extensive Metrobus system. A list of free Metrobus fringe parking lots, located at strategic points on the outskirts of the metropolitan area, is available from the Associates Reception Center at the above address.

Museum Hours
Most museums on the Mall are open daily 10 A.M. to 9 P.M. through Labor Day. After September 5 the museums will close at 5:30 P.M.

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PA29

Exploring the World with the Smithsonian

For both the seasoned and would-be traveler, the Smithsonian has developed a travel program to meet a variety of tastes and budgets. In an effort to meet the increasing growth and interests of Smithsonian Associates, the tour programs have expanded, bringing travelers to places reflecting the Institution's interests. Whether the destination be a foreign land or a site in the United States, the Smithsonian has planned an intriguing, educational experience, and often an adventure. Smithsonian personnel evaluate the travel offerings and accompany all trips.

Three types of trips are available, Study, Charter and Domestic, each with its distinct character. Foreign Study Tours provide small groups with culturally oriented, specialized trips, under the guidance of museum curators, or experts in respective fields. Foreign Charter Tours are larger (they are broken up into several small groups under the leadership of skilled guides and interpreters), lower in cost, combining study, discovery and vacation. Domestic Tours offer specialized guidance and expertise of a kind generally unavailable to persons traveling on their own.

Predeparture lectures and courses are optional on many of the foreign tours.

Foreign Study Tours

Peru, Ecuador and Colombia—September 28-October 19, 1977: Art and archaeology. Elizabeth Benson of Dumbarton Oaks, guest lecturer.

Egypt and Petra via Red Sea—January 30-February 9, 1978: Plane via London to Cairo, board MTS *Argonaut* at Suez for Red Sea, visiting Luxor from nearby port before cruising on to Jordan for Petra.

Himalayan Cultures—March 4-25, 1978: Delhi, Agra, Calcutta, Darjeeling, Nepal, including tigers and Everest viewing, and Bhutan for a five-day exploration.

Medieval Southern France—April 2-16, 1978: Museums, architecture and gastronomy from Paris to Barcelona via Périgueux, the Dordogne, Conques, Moissac, Toulouse, overnight on Canal du Midi.

Gods and Gardens in the Western Mediterranean—April 29-May 15, 1978: with Cruise on MTS *Argonaut* from Rome to Lisbon, visiting Roman and medieval centers of civilization in northern Italy and France; spring gardens at their height, plus Barcelona's museums and architecture, Moorish Spain and Tangier.

Thomas Jefferson in England and France—July 9-30, 1978: His travels retraced, with emphasis on country houses and gardens he admired plus appropriate areas and houses in London, Paris and Nîmes; led by Professor Frederick Nichols of Charlottesville.

Aegean Sites of Civilization—October 7-29, 1978: A cruise on MTS *Argonaut* with Dr. Richard H. Howland; mainland and island sites on both shores, including Thrace, Istanbul, Troy, Ionia, Mt. Athos, Mistra, Thera, Crete and principal classical sanctuaries, leaving from and returning to Athens. **Optional prelude may be the following:* Nostalgic Orient Express—October 2-8, 1978: in vintage cars, restored, over original Simplon routing from Zurich to Athens: occasional sightseeing stops en route.

For detailed information write Miss Bliss Schumann, Foreign Study Tours, S.I. 123, Smithsonian Institution, Washington, D.C. 20560 or call (202) 381-5520.

Foreign Charter Tours

Mayan Mexico: The Yucatán Peninsula—January 6-18, January 28-February 9, November 10-22 or December 2-14, 1978: A complete tour of the extraordinary Mayan ruins of the Yucatán. Accompanied by an archaeologist, visit the sites of Chichén itzá, Palenque, Uxmal Tulum, plus the seldom visited sites of Edzna, Kohunlich, Rio Bec and Cobá. Also includes a brief pause at Akumal on the Caribbean Sea. An adventure tour. (Originates in Mérida).

Guatemala—February 15-25 or November 22-December 2, 1978: In the company of an archaeologist, visit Tikal, the monumental Mayan City of the Petén jungle; Copán, a Mayan site deep in the mountains of Honduras; plus the Mayan ruins of Quiriguá, El Baúl and La Democracia. Travel to the Guatemalan Highlands to visit Lake Atitlán and Antigua—the Spanish colonial capital preserved in its 17th- and 18th-century splendor. Also visit Chichicastenango with its ancient market and Indian rituals. Guatemala is a must for Mayan archaeology and Indian textiles. An adventure tour. (Originates in Guatemala City).

Kenya, East Africa—February 2-19: Wildlife and tribal life adventure providing modern African insight—and the "Africa that used to be," in the old safari tradition. Seminars in Nairobi and in the field—Masai Mara; Samburu; Tsavo.

Italy*—May 1-15: The complete Rome plus choice of Travel Seminars to Florence, Venice or Campania; museum seminars; walking tours of ancient sites; Baroque churches and Renaissance mansions in Rome; excursions to Tivoli, Ostia Antica, Etruscan ruins, or along the Appian Way.

Russia*—May 8-22: Leningrad, Tallinn and Moscow; see the Hermitage and Tretyakov Museums, the palaces of Pushkin or Petrodvorets; life-seeing visits to schools, factories or clinics; attend the best of Russian theater and circus.

Paris and Provence—May 15-29 or September 4-18: Paris plus Avignon, Arles, Nîmes and Aix-en-Provence; museum seminars at the Louvre and the new Pompidou Center; walking tours of the islands of the Seine; excursions to the Loire, Chartres or Reims.

Scotland—September 25-October 9: Edinburgh and beyond—a program of walking tours and special visits in Edinburgh; visits to castles, abbeys, battlefields and archaeological sites, plus incomparable scenic beauties of rugged mountain glens and rolling hillsides throughout the Highlands and Lowlands of Scotland.

The Caucasus: Armenia, Azerbaijan and Georgia*—October 9-23: The spectacular mountain scenery of Transcaucasia; the ancient cities of Erevan, Tbilisi and Baku; medieval churches and Mosques; the Caspian Sea and mountain fortresses. An adventure tour.

Low cost of tours includes first-class hotels, most meals, sightseeing, lectures, theatre tickets and air fare. * Optional predeparture course will be available. Write Smithsonian Associates Travel Program, A&I 1270 B, Smithsonian Institution, Washington, D.C. 20560 or call (202) 381-5635 for details.

Domestic Study Tours

The River of No Return—September 10-25: A boat trip on the Salmon River in Idaho past precipitous canyon walls, wide sandy beaches and pine forest in this majestic country rich in wildlife, history and prehistory.

California Wine Country—October 2-8: From San Francisco, visit selected vineyards in Napa, Sonoma, Santa Clara and Monterey, with wine tasting and lectures by vineyard owners and wine masters.

Membership Benefit

Plan Now For Fall, Winter And 1978

Archaeological Dig —October 15-22: Join archaeologists in the excavation of an Illinois River Valley site spanning almost 10,000 years. Actual digging will be supplemented by instruction, lectures, laboratory work and field trips.

Antebellum Homes of Alabama –October 29-November 6: In 1850 Alabama's plantation owners were the leading cotton producers of the country. They lived in a grand manner that has become legendary. Under auspices of local historical societies, we will learn about the history and traditions of this "golden era."

National Air and Space Museum Weekend for the Blind —October 28-30: Special programs are planned with the museum curators to give meaning to the displays.

New York, New York—November 11-14: An exciting weekend of special art museum tours, including the Cooper-Hewitt, the newest Smithsonian museum.

Christmas at the Smithsonian —December 9-11: Sixth annual Christmas weekend with traditional tree-trimming party and holiday festivities. Special program at the Renwick Gallery; private viewing of the First Ladies' Gowns and Presidential China; behind-the-scenes tours in the Smithsonian Castle and National Zoo.

Victorian Washington —January 27-29: A fascinating program of lectures and neighborhood walking tours to learn about the city's 19th-century architecture and history.

Baja Whale Watch —February 18-25: Travel by chartered sport-fishing boat from San Diego to San Ignacio Lagoon; study the California gray whale and other marine life through observation, on-site lectures; hike on deserted islands, study the Baja plant and bird life.

Yellowstone in Snow —February 24-March 5: Discover Yellowstone in the peace and majesty of its winter season; learn about the wildlife and geography of the park and the surrounding region.

Washington "Anytime" Weekend —Visit the nation's capital and tour the original Smithsonian building. Spend two nights at Loew's L'Enfant Plaza Hotel (reservations required ten days prior to weekend).

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By Patrick Ryan

Get rid of the people, and the system runs fine

Until Theseus terminated his fell career, Procrustes, the legendary Attic brigand, used to measure his captives on an iron bed. If they were longer than the bed, he chopped off their surplus parts; if they were shorter, he stretched them till they fitted. Some revival of this Procrustean precept that the people should be made to fit the system can be detected these days.

Note this newspaper report from the Midlands of England: "Complaints from passengers wishing to use the Bagnall to Greenfields bus service that 'the drivers were speeding past queues of up to 30 people with a smile and a wave of a hand' have been met by a statement pointing out that 'it is impossible for the drivers to keep their timetable if they have to stop for passengers.' "

It will thus be seen that the official function of a bus service is not, as popularly misconceived, to carry people from A to B, but to meet its timetables. The sacred schedules must be maintained, even if the bus has to run empty. Therefore, ultimate efficiency of bus services can be achieved only if passengers are banned altogether. Such a prohibition would have the ancillary advantages of extending clutch and brake longevity and markedly reducing the wear and tear on the upholstery. Much the same attitude can be observed in the facial expressions of the staff at any airport as they handle your tickets, while longing for the day when they can be left to run the place like clockwork with their TV screens and admonitory announcements, without all those blasted, disorganized air-travel passengers milling about all over the place.

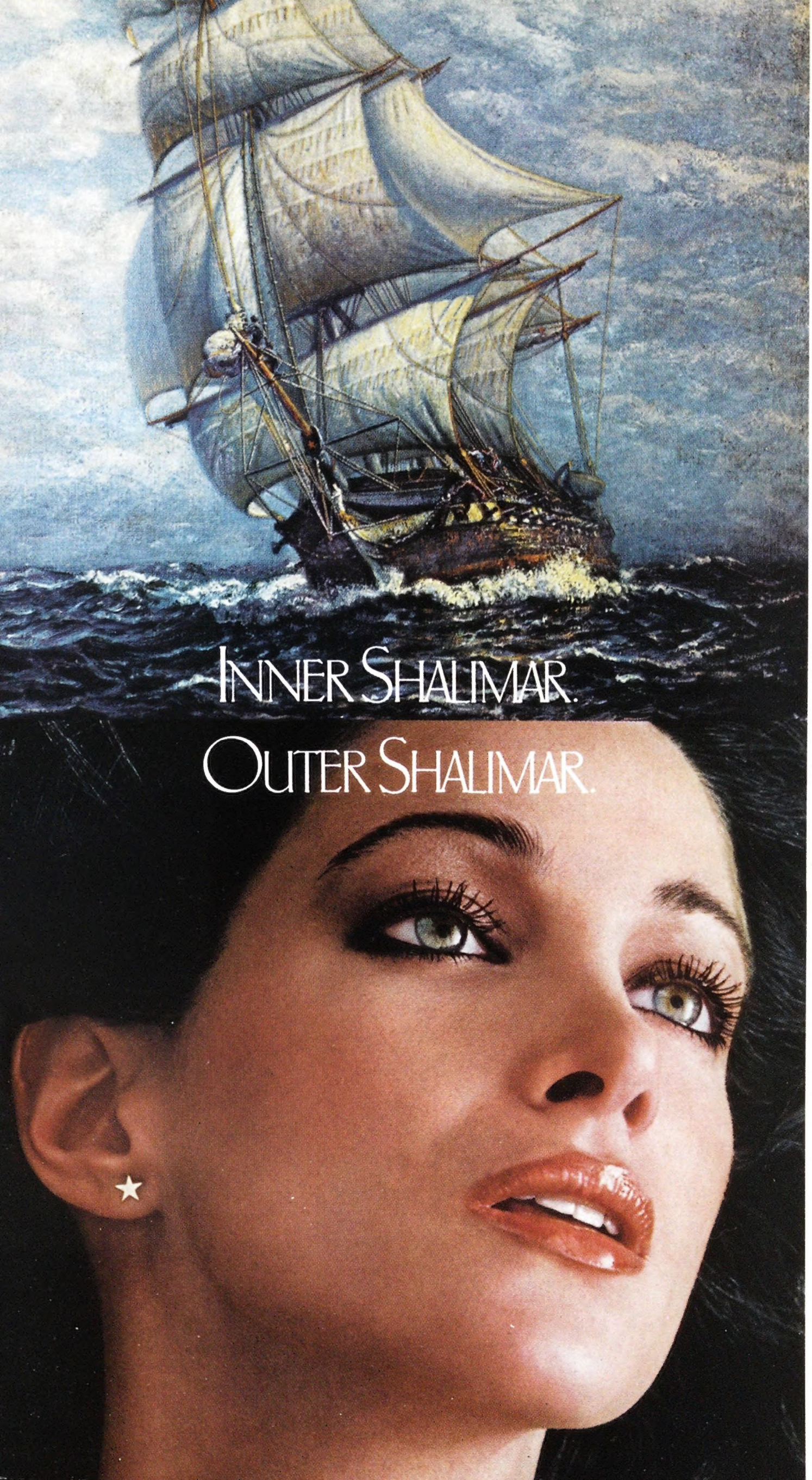
On the stationary side, John Cleese, the skyscraping British comic of Monty Python fame, runs a television series in Britain in which he plays a manic and domineering hotel proprietor. He said that he got the idea from actually staying at a West of England hotel "where there was this wonderfully rude owner who maintained that the guests stopped him from running his hotel. . . . It was the first time we'd come across such a situation—now I know that it happens all round the world."

And all round the world, hoteliers painstakingly display their monastic rules and detailed eating routine on that card on the bedroom door. Only if all prisoners obey its timely regulations can the establishment's system be operated harmoniously. The virtue most in request, as Emerson once bemoaned, is conformity. It is ill-trained guests like you and me, who forget the feeding orders and lie abed to unhinge the cleaning rota, who are the monkey wrenches in the hospitable works—thus driving hotel managers to dream of that perfect Grand Hotel which runs with daily, clockwork precision, where all meals are completed on time, all rooms are cleaned to split-second schedule, and the bartenders can keep their glasses eternally polished to perfection—because the place steadfastly refuses to take in any guests at all.

An occupational psychologist employed as a consultant to a Middle Eastern air force recently reported an unusual method of fitting people to prevailing constraints. There was a local supply difficulty in obtaining irregular sizes of uniform shoes for airmen. So, in philosophical compromise, the recruiting board selected successful candidates on the regular proportions and commonplace dimensions of their feet.

A popular weapon of bureaucrats bent upon keeping people subservient to their system is the regular demand that they categorize their lives on meaningless forms and unnecessary returns. I have long admired the ploy that George A. Birmingham, the novelist and essayist, adopted in retaliation. In his nonliterary life he was a clergyman in Ireland and, as such, he was pestered by bishops and other authorities to fill in recurring questionnaires. He took particular umbrage against the annual demand from the education office to report the dimensions of his village schoolroom. In the first and second years, he duly filled in the required figures. On the third year, he replied that the schoolroom was still the same size as before. Schoolrooms are not trees, he observed, they do not grow. The education office badgered him with reminders until Birmingham finally filled in the figures.

But he didn't put in the same figures as before. He doubled the dimensions of his schoolroom. Nobody queried it. So he went on doubling the measurements until "in the course of five or six years that schoolroom became a great deal larger than St. Paul's Cathedral." But nobody at the education office was at all concerned. So, the next year, the Canon suddenly reduced the dimensions of his colossal classroom "to the size of an American tourist trunk. . . . It would have been impossible to get three children, without a teacher, in that schoolroom." And nobody took the slightest notice, for nobody needed the information. But the system did, and the system had to be satisfied. So why not try the George A. Birmingham treatment next time they send you a form to fill out?



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